REPORT: THE WORLD CONGRESS OF FLIGHT

FLYING

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JULY

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RIDING THE TEMCO PINTO

Piston engine plane pilot flies a jet

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CRADLE OF THE "A" ENGINE

Where they solve the complex problems of nuclear aircraft powerplants

★

THE "172" IN THE BUSH

They said it could not be done but the proof of a pudding is in the eating

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By winning the U. S. Air Force light-twin competition, the Cessna 310 proved its superiority over every other light twin in this crucial test of power and safety. Now in '59, the *High-Efficiency* 310C climbs still faster on one engine at 440 feet per minute—*with five passengers!*

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Be sure to try all the *High-Efficiency* features of the new Cessna 310C. Price: $59,950 f.a.f. Wichita. Call your Cessna dealer now (Yellow Pages of phone book). Look at all *seven* great Cessna models. Also ask your Cessna dealer about lease plans. Or write: Cessna Aircraft Company, Dept. F-9, Wichita, Kan.

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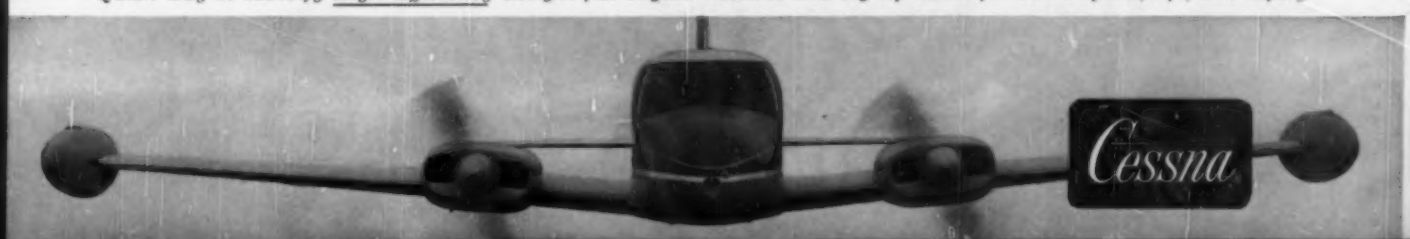

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Here's what you want to make flying in your Cessna the last word in travel ease and restful transportation – the remarkable new Levelair by Tactair, a superior, low-cost automatic flight system developed for Cessna by Tactair, leading builder of automatic pilots for business aircraft.

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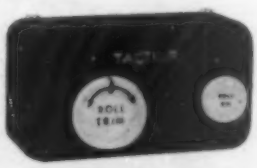

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JULY, 1959 VOLUME 65, NUMBER 1

CONTENTS

Editorial: Airpower Articulate 23

Report on the World Congress of Flight 24

Non-stop Texas to England . . . . . *Bill Mullen* 27

Cradle of the "A" Engine . . . . . *Rafe Gibbs* 28

Instruments . . . . . *Col. E. A. "Pete" Goff, Jr., USAF, Ret.* 30

The Airman's World . . . . . *Gill Robb Wilson* 32

The "172" in the Bush . . . . . *Ralph C. George* 34

Operation Jericho . . . . . *David West* 36

Wings with Spring . . . . . *Glenn Infield* 38

The Pro's Nest: Flicker Vertigo . . . . . *Scholer Bangs* 39

Riding the Temco Pinto . . . . . *Norman Jacobshagen* 40

Air Sport Center . . . . . *C. L. Hamilton* 42

Cross-country Pilot Report on the Fornaire . . . . . *Alice S. Fuchs* 44

Have You Seen? 46

I Learned About Flying From That!, No. 233 . . *Manuel J. Donnelly* 48

FLYING FEATURES

Mailbox 6

Briefings 10

Hangar Flying 14

Have You Read? 16

Flying Calendar 20

Overnight Stop, No. 51 66

Picture Credits 77

Advertising Index 78

THE COVER: Anthony Linck photographed this 180 Lycoming-powered Mooney Mark 20A while flying his own Mark 20 around New York harbor.

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MAILBOX

LF TO THE RESCUE

I have read with great interest the "Hangar Flying" item signed by John W. Brink of Blythe, Calif., in your April issue, wherein he relates a story of a flying experience and of visibilities he actually encountered against those reported by the U. S. Weather Bureau.

I operated a large, privately-owned, commercial airport for many years and Mr. Brink's story is similar to those of a large number of pilots I have seen participating in cross-country flight.

Mr. B., I believe, was unfamiliar with Civil Air Regulations. What he should have known was that the weather report he received in flight on his L/F receiver "visibility four miles over the basin" was the reported *ground* visibility for that station and not the *flight* visibility; the USWB does not, in its hourly weather sequences, report the flight visibilities. CAR, Part 60 makes a clear distinction between flight and ground visibilities, and it is the ground visibilities that are reported in the sequences.

In such cases where a pilot might receive a favorable weather report for any station indicating VFR conditions and later in flight he encounters unfavorable conditions for VFR, it is encumbent upon him to remain out of control areas unless he has obtained an air-traffic clearance and he holds a valid instrument rating and his aircraft is properly equipped for instrument flight.

NAME WITHHELD ON REQUEST.

YPQ 14?

I am writing in hopes that through your many readers I will be able to obtain more information, and perhaps the whereabouts, of the YPQ 14 built by the Culver Co. and in production until about 1948 for the Army or Air Force. Used primarily as a drone, the best description I have been able to come up with is that it was of wood construction, single plane, with a 90-hp engine and had electrically operated retractable tricycle gear and flaps. It was painted a very bright red finish and had a top cruising speed of 150 mph. A friend who used to have the pleasure of flying these while in the Ferry Command nicknamed it "a miniature P-39." . . .

If I can learn of the whereabouts of this delightful gem, this could well be the aircraft to help quell the desire to fly and own a WW II fighter plane.

GEORGE A. HILLMAN, JR.
3904 Loquat Ave.,
Coconut Grove, Fla.

OUR PLEASURE

Many thanks for inserting the note regarding the Teterboro Flying Club in a recent "Mailbox."

We have had a tremendous response from enthusiastic flyers from various parts of the country. Although we had to turn down some of the interested ones at this time, we wish to thank those who wrote in for information. . . .

H. N. SMITH, Secretary
Teterboro, N. J.

AND SO IT WAS

On my recent transfer to Okinawa I carried a bunch of old issues of FLYING in my seabag. During the long ocean trip I was able to catch up on many interesting articles I hadn't had time to read before. In the April 1956 issue I noticed something familiar in the picture illustrating "Pipe's to Kites"—a picture of Lt. F. Lee Bailey standing between an FJ-2 Fury and a Luscombe.

"That looks like my Luscombe," I thought. Upon reading the little ship's No. N1234B, I had a double interest in the story! The Luscombe in the picture had become my proud possession July 10, 1957. It's great to find a picture of one's own ship in FLYING!

I passed my private check ride about

six weeks before my transfer and, although I kept the Luscombe, I'd resigned myself to non-flying status for many moons. But soon after arriving on "Okie" I learned that I could continue flying by joining the Naha Aero Club which I did promptly. We have about 75 active members. Our planes consist of a J-3; a Tri-Pacer; a Stinson L-5 and a 65-hp Taylorcraft. The membership is selective and there is a long waiting list.

The fact that I enjoy your magazine is confirmed by the enclosed subscription.

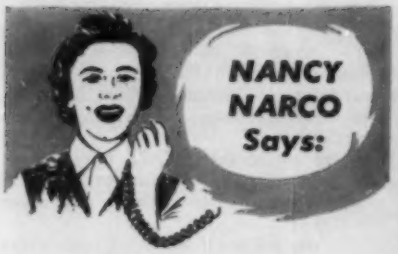
A/SGT. LOUIS EVERS
FPO, San Francisco, Calif.

WITHIN AN INCH OF YOUR LIFE

Ever hear the old saying, "Well, cheated Death again"? This holds true in the article "Within An Inch of Your Life," in the March issue.

In the summer of 1953, while stationed at Tyndall AFB, Fla., a C-45, alias twin Beech, had similar trouble from the same

(Continued on page 8)



Positive VOR Identification

With so many new Omni stations being added and frequencies of existing stations being switched around so fast, better be careful to check information given on regular Sectional or Regional (WAC) charts.

Case in point occurred just a few weeks ago. A pilot called in to say he had just passed the Caldwell, N. J., Omni and none of the landmarks looked right. And well they shouldn't have — he was 28 miles away from where Caldwell *used to be!* Caldwell was decommissioned about three months earlier and its frequency of 115.4 mc was assigned to Stillwater, N. J., Omni, 28 miles to the northwest. Our pilot, flying with a "current" New York Sectional chart, took a bead on what he thought was Caldwell, by tuning to 115.4 and he wound up quite confused, to say the least, over Stillwater.

Now, where he made his mistake was just assuming that the station he had tuned on 115.4 was Caldwell. He failed to check the code identification. If he had, he would have known that he was tuned to STW and not Caldwell.

This is a rather unusual case of the same frequency being switched to an Omni in the same general area, but it can happen.

Positive identification is also desirable because there might be several Omnis in the same area which are only one or two tenths of a megacycle apart. Check that identification positively before you start heading for any Omni station.

How can you keep up with all the frequency changes and new Omnis which are being plugged in? The hard way is to keep track of all notices in the Airmen's Guide. All changes, shutdowns, and new locations are published in the current issue, but might not show up in the good book a month or so later.

The best way is to use current radio navigation charts. These are revised every few weeks to show all changes and are a must for anyone actively using an airplane cross-country. Once you've started using them, the WAC and Sectional charts stay in the glove compartment, reducing cockpit clutter.

Radio charts make your whole cross-country work simpler, more certain, more business-like. Two subscription services are available—either the Coast and Geodetic Survey, Washington, or Jeppesen in Denver. You can subscribe for just the radio chart service or get the full treatment including all instrument approach procedures.

With up-to-date radio facility charts and good radio equipment, cross-country is a cinch—and a lot less confusing.

Regards,

Nancy

NARCO • Fort Washington, Pa.

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18-OUNCE • COMPLETELY SELF-CONTAINED

3-LIGHT

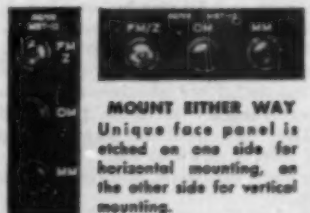
MARKER BEACON RECEIVER

narco MBT

Here's great news for single and twin-engine owners — an airline-type three-light marker beacon receiver that weighs only 18 ounces and is priced at a fraction of the cost of similar equipment now on the market.

The Narco MBT gives you positive identification of airways and LF range Z markers (white light); ILS outer markers (blue light) and middle markers (amber light). Provides aural identification as well.

And it's all completely self-contained! No separate power supply; no complicated wiring; no shock mount needed. Case measures less than 3½" by 1⅛" by 6", can be quickly and easily panel-mounted. You'll find the Narco MBT so useful and helpful, so many ways.



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MAILBOX

(Continued from page 6)

cause. Someone forgot to install a nut on the elevator quadrant bolt.

Lady Luck smiled this time also. Final score a very shook up pilot and a more shook mechanic who went along for the ride. Numerous red faces in the mechanics' and inspectors' ranks plus a Beech with a scrubbed belly and beautiful pair of sweptback props.

All agree the installation is hard to see on final inspection but a good flashlight and inspection mirror works wonders.

GARRETT SMITH

Idlewild Int'l Airport, N. Y.

BELOW THE BORDER

This past November, together with a friend, I flew a new Super Cub some 70 hours over a great deal of Mexico. Having been more or less active in civil and military flying the past 25 years, I have seen a number of airports from terrible to wonderful.

One of the most pleasant surprises was landing at the new Aeropuerto SCOP., some ten miles east of Chihuahua, and taxiing to the Piper Dealer's Central Aeronautica. The facilities, prices and prompt, courteous and efficient service were comparable to the finest "country club airport" in any country I have visited. If you are a jaded Airdale with a touch of inferiority complex, I suggest you stop at Chihuahua, but not on the old strip at the northwest edge of town and still shown on the charts. It has been closed for two years. . . .

REV. JOE S. HOOKER

Bellflower, Calif.

FOR QUICK RESULTS

A little note of interest that I thought might be helpful to other plane owners like myself.

I am an Air Force major and three times have had to leave home on a sudden change of station. First time I had a Culver V. Couldn't sell or give it away. Couple years later got overseas orders and had an Ercoupe on my hands. Both times I left my planes with Leo Yoder of Aircraft Sales and Service in Long Beach, Calif., recommended as a most reliable dealer. Mr. Yoder cleaned up both planes, sold them and sent me a check promptly.

Late last fall I got another fast shipment overseas. My recently purchased Cessna 170B was a problem on such short notice. I flew it down to Mr. Yoder. . . . Recently I got his check, and for my asking price.

That's a real service and a relief for anyone contemplating buying a plane but afraid they might not be able to resell it if in need of cash, or if they have one they must sell quickly.

MAJ. E. D. PENROD

5040th Air Base Wing
APO 942, Seattle, Wash.

STATE AIRPORT DIRECTORIES

The State of Illinois Department of Aeronautics is to be congratulated on their most excellent free airport directory, which you mentioned in "Briefings," February FLYING.

Their use of aerial photographs to replace airport diagrams is outstanding and a marked improvement over any other method.

Can you tell me if any other state offers an Airport Directory of any sort?

U. OWEN WALKER

Memphis 12, Tenn.

● *Offhand we think of Idaho, Utah, Pennsylvania, New York and Arizona, but for a complete list would suggest writing to the National Association of State Aviation Officials, 1101 Vermont Ave., N.W., Washington 5, D. C.*—ED.

REQUIEM

By the time you read this undoubtedly you will have received 500 letters on the mistake in your article "Requiem to the B-36" by Dave Karten in the May issue. Mr. Karten (page 84) refers to the (AC) primary electrical system pioneered in the Magnesium Monster and now standard equipment on the newer crop of military aircraft, among them the "F-104 Voodoo." A goof?

By the way, didn't they keep No. 704 B-36 at Amon Carter Field, Fort Worth, in memory of the grand bird?

BOB BOGASH

New Rochelle, N. Y.

● *The F-104 is indeed not a McDonnell Voodoo. It is a Lockheed Starfighter. The Voodoo is an F-101A. (Also a slip is in listing SAC bombers as B-37s and B-52s. Of course, it's B-47 not B-37!) If we get off with 500 letters we'll consider ourselves real lucky! As for No. 704 having been retired to Amon Carter Field, whether it is the 704 we do not know, but we do know that a B-36 is now enshrined there as a memorial to the men who built it, maintained it and flew it. This B-36, last stationed at Biggs AFB, El Paso with the 95th Bomb Wing, was flown to Ft. Worth on Feb. 12. Twenty-three persons, including 14 crewmembers, were aboard this final flight as it put down at Amon Carter to be greeted by brass band and many distinguished guests, civilian and military. Here it will be the center attraction of a landscaped park southwest of the terminal building and will be maintained by the Convair Management Club.*—ED.

". . . and I never dreamed the new Bonanza was so easy to fly!"

Fly it and discover speed and economy unmatched by any other plane in its class:

Even if you're an experienced Bonanza pilot, you've got a terrific thrill coming the first time you fly a new 1959 K35 Bonanza. And if you've never flown a Bonanza at all, you simply can't imagine the difference between flying this new '59 Bonanza and all other airplanes. In either case, visit your Beechcraft distributor or dealer this month and accept his invitation to fly the new Bonanza yourself.

Here are just a few reasons why the 1959 Bonanza is today's outstanding single-engine business plane:

1. Continuous-flow fuel injection engine for easier starting, smoother operation and complete freedom from carburetor icing.

2. Cruises 200 mph at only 75% power. Top speed of 210 mph.

3. New longer range—up to 910 miles with standard tanks. Up to 1,245 miles with auxiliary tanks.

4. Climbs at 1,170 fpm. 20,000 ft. service ceiling.

5. Amazingly low operating cost—uses less gasoline and oil than the average family car.

6. Exceptional visibility—and so quiet inside you can talk in normal tones in flight.

7. Rugged construction permits it to be licensed in a category requiring 15½% more strength than the category in which other single-engine business airplanes are licensed.

Besides this outstanding performance and unequalled comfort, Bonanzas are famous for low depreciation that protects your original investment.

See your Beechcraft distributor or dealer for a demonstration soon. Ask him, too, about low-cost financing and leasing plans, or write Public Relations Dept., Beech Aircraft Corp., Wichita 1, Kansas, U. S. A.

SUPER 18 TWIN-BONANZA BONANZA TRAVEL AIR MS 760 JET

Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Briefings . . .

SOMETHING RECENT with Weems System of Navigation, Annapolis, Md., is this new Pilot's Clip Board, Mark 11A. Designed to hold the new official 5 x 8 in.

Approach and Landing Charts, it has convenient pencil holders and a built-in pencil sharpener. The leg strap is adjustable in size, with a snap fastener. The price is $10. With light, $15.

PROPOSED CHANGES requiring student and private pilot applicants for medical certificates to take physical examinations from designated medical examiners is currently under examination by FAA. After comments from general aviation interests have been studied (closing date for which was May 18 last) decision will be made public.

NAMED AS ACTING CHIEF of the Office of Public Affairs in the FAA is Chester "Chet" Spurgeon. Mr. Spurgeon was previously Director of Information for the CAA. The Office of Public Affairs, Washington, D. C., is central information office for inquiries dealing with FAA operations.

EASTERN AIR LINES' passengers at N. Y. International Airport will momentarily be using this $18 million structure ($20 million with supporting facilities) said to be the largest passenger building in the world for use by a single airline.

Shown in the foreground of this architect's sketch are the building's two arcades with loading gates for 16 jet-age aircraft simultaneously. At background left is the International Arrivals Building.

UPON REQUEST the Colorado Fuel and Iron Corp., 575 Madison Ave., New York 17, N. Y., will be glad to send their illustrated brochure which explains the new Wickwire Rope Tiedown System for all types of aircraft. Titled "Tiedown High Insurance Costs and Increase Tiedown Revenues," the brochure diagrams proper tiedown procedures and suggests cost-cutting ideas for airports of all sizes.

THE LIGHT AIRCRAFT OPERATOR has not been forgotten in this era of jets. According to a recent FAA announcement more than 3,000 new air markers were installed during 1958 by State Aviation Commissions, civic and aeronautical groups in 24 states. This was in addition to keeping thousands of older markers at peak visibility.

NARCO'S LATEST is the MBT, a three-light 75 mc marker beacon receiver completely self-contained. An 18-oz. instrument, measuring 3⅜ x 1⅛ x 6 in., the MBT employs simplified circuitry and 100 per cent use of transistors to provide airline type indication of enroute airway fan markers, LF range and Z markers, outer and middle ILS markers, each type of marker being indicated by a different colored light. In two versions MBT/12 for 12-volt operation and MBT/24 for 24 volts. Price $230, National Aeronautical Corp., Fort Washington, Pa.

BENDIX RADIO DIVISION has introduced the INA-21A, a new VOR/ILS airborne navigator indicator. A standard three-inch instrument, it provides—in one-unit—VOR and Localizer pointer, glide slope pointer TO-FROM indicators, three marker beacon indicator lamps, an omni-bearing selector, and flag alarms for both VOR/Localizer and glide scope pointers. In production at Baltimore, Md. facilities, this new unit is the latest addition to Bendix "21 Series," lightweight airline-type nav/comm equipment.

BEECH AIRCRAFT has added Atlantic Aviation Corp., Wilmington (Del.) Div., to its network of distributors; and the De-Havilland Aircraft Pty. Ltd. of Sydney as Beechcraft distributor in Australia.

OWNERS OF BUSINESS and private aircraft may now charge fuel, maintenance, plane charter and other aviation services (and be billed monthly) through the American Rwy. Co.'s new AMEX credit card system. These charges are in addition to those for accommodations, meals, entertainment, car rental and other business expenses. AMEX, now established at 102 airports in 37 states, will eventually be on a worldwide basis.

WHAT OTHER ARCHITECTURAL PATTERN could those responsible for design of an air terminal at Natchez, Miss. employ other than that which is common to 30 or more of the ante-bellum homes in the immediate vicinity?

The terminal and airport, dedicated only recently, is seven miles northeast of Natchez. Served by two local airlines, the airport offers three 5,000-ft. hard-surfaced runways, runway lights and unicom. Wm. D. Simmons is manager.

PROCEDURES MANUAL from Coopers Industries, Inc. 3722 W. North Ave., Chicago 47, Ill., offers valuable information necessary in the recovering of fabric planes and parts. Discusses application of fabric and dope; techniques, specifications, preventives, and includes a special chapter on removal of old fabric. Price: $3.50.

DELIVERY OF A 350 mph Super B-26 to G. C. Murphy of McKeesport has been announced by L. B. Smith Aircraft Corp., Miami, Fla. The newly acquired aircraft, piloted by James K. Jordan and Dave Jones, chief pilot and co-pilot, respectively will be used to cover the company's 414 variety stores stretching from the east coast to the Mississippi.

EXTENDING 1000 MILES southwest from Alaska along the Aleutian Island Chain, six new DEWline radar stations are in operation. These powerful radar sentries, such as the one shown here at

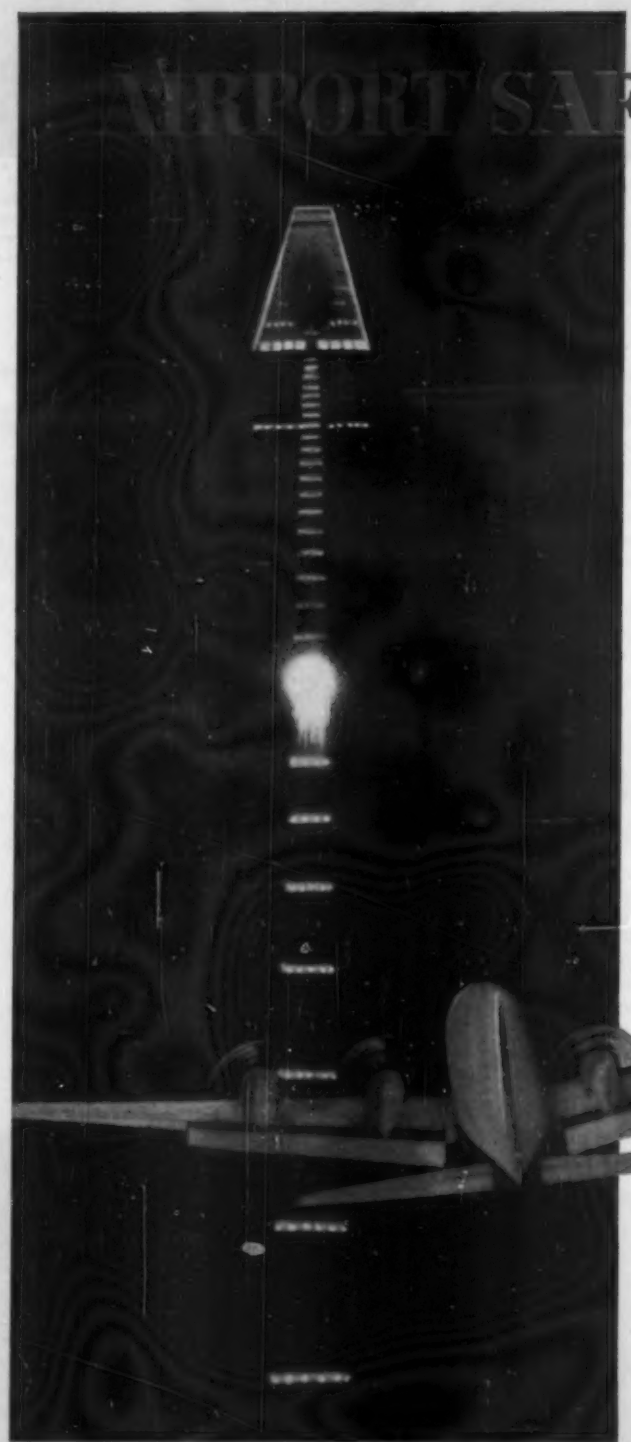
Cape Sarichef on Unimak Island are designed to prevent long-range Soviet bombers from making an undetected end run around the earlier established and well-known northern DEWline across the Arctic wastes of Alaska and Canada.

THREE NEW PUBLICATIONS out of Washington, D. C., will add substantially to one's aviation knowledge yet hardly dent one's exchequer. (1) "U. S. Aircraft, Missiles and Space Craft 1959." Formerly "U. S. Aviation Today" it is compiled by

(Continued on page 82)

FLY WEATHER-WISE — Mobil

These weather items prepared in consultation with the United States Weather Bureau



Photograph courtesy of Sylvania Electric Products, Incorporated

AIRPORT SAFETY DEVICES

LANDING AIDS

New landing aids are allowing pilots to make maximum use of airport runways, even under poor weather conditions. For example, the flashing strobeacon lights shown in photo at left. Sequence-flashing lights create a swiftly moving "fireball" which accurately guides planes to the approach end of the runway.

Remote reading instruments and new observation techniques are being used to report precise landing visibility measurements at major airports. They tell pilots what can be seen in flight rather than what is visible to an observer on the ground.

Runway Visual Range (RVR)—Horizontal distance along runway at which pilot touching down can expect to see high intensity runway lights. Measurements are determined by photo-electric Transmissometer.

Approach Light Contact Height (ALCH)—Based on slant visual range of pilot. Given in terms of altitude in feet on the glide path at which a pilot can expect to see approach lights. ALCH is computed from measurements made by Transmissometer, Ceilometer and other instruments. (In use at present only at Newark Airport, N. J.)

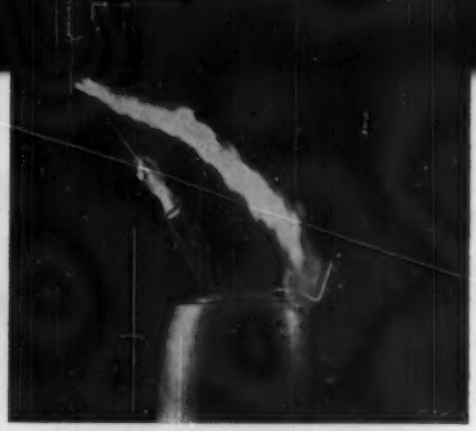
Rotating Beam Ceilometer—Electronic weather instrument used to measure vertical visibility and the height of bases of clouds.

For safer landings . . . top performance at all times . . . it pays to rely on Mobil aviation products. There's Mobilgas Aircraft, Mobiljet fuels, Mobiloil Aero, Mobil hydraulic oils and greases. They all meet and exceed rigid U. S. Government specifications. Fly weather-wise . . . Fly Mobil!

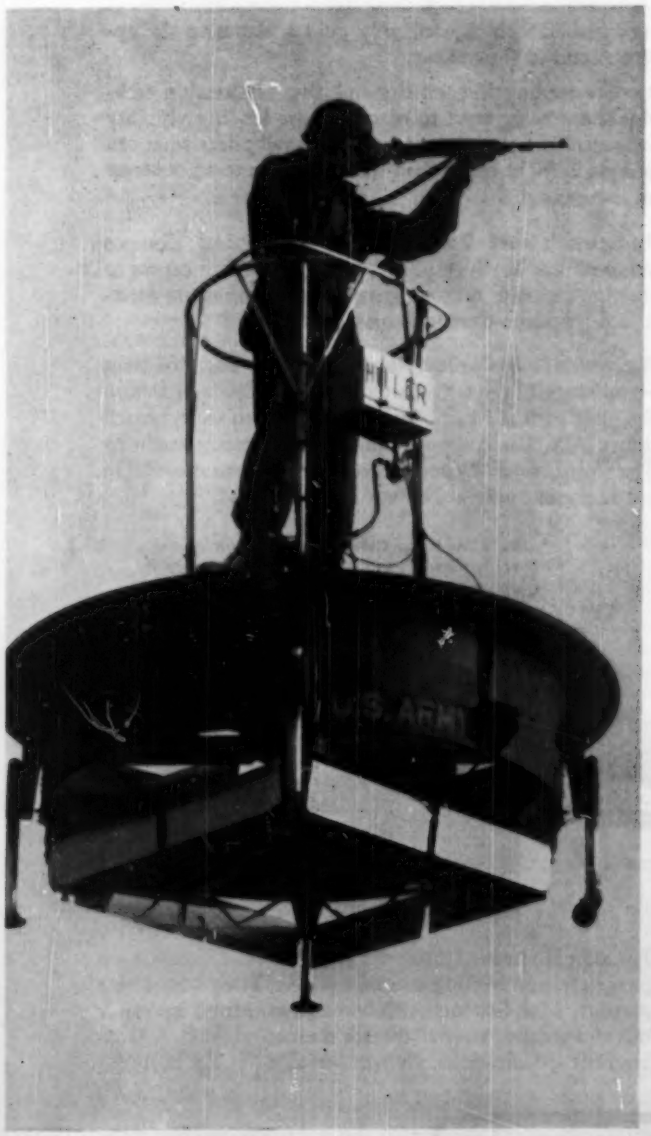
You're Miles Ahead with **Mobil**

Tune in "TRACKDOWN" every Wednesday night, CBS-TV

First vertical takeoff-landing transport, Air Force's 16½-ton Hiller X-18 tilt-wing, now in test at Edwards AFB. Power: Two Allison T-40 turboprops totaling 11,070 hp plus 3,400-lb. thrust Westinghouse turbojet for transition and hover control; approved with Champion Jet Igniters. (Champion pioneered jet igniter development with experimental engines in '42, remains in forefront today.) Hiller Pres. Stan Hiller predicts "inevitable conversion of entire transport system to VTOL."



Project Engineer M. F. Gates uses smoke filament "to check entrainment of ambient air by downward deflected jet flow" in VTOL lift project. Basic research contract in external jet mixing was awarded Hiller's Advanced Research Division. (New high-temperature adhesives subsidiary puts Hiller into space race.)



"Look, man! No hands!" Without hands on controls, pilot demonstrates hovering stability of Hiller ducted-fan "Flying Platform." Nelson H-53 engine manufacturer worked with Champion, mating plugs to engines during development stages. Now underway are three separate military ducted-fan projects—outgrowth of unconventional flight concepts proved by Flying Platform. One is development of experimental vehicle in higher speed range for Bureau of Aeronautics.

"...feet planted square in mid-air..."

A behind-scenes report on Hiller Aircraft Corporation... one in a series on why helicopters and VTOL aircraft, like the world's airlines and business fleets, use Champion Spark Plugs

Hiller XROE-1 Rotorcycle, world's smallest collapsible 'copter, can be unfolded by one man and flown in less than five minutes! Pilot models of the Champion-fired Rotorcycle are scheduled for delivery to Marines shortly. Test engineers found Champions mandatory to ensure dependability of 45-hp, 290-lb. Rotorcycle.

(ADVERTISEMENT)

Perched on a mountain top doing a commercial job is the new Hiller 12E. The Champion-equipped, 305-hp 12E is the most powerful production 'copter in the 3- to 4-place class, Hiller reports. First deliveries of the lightweight commercial 12E are in progress. Hiller is aiming for 50-50 commercial and military sales. (Nearly 80% of total Hiller business in 1958 was military.)

Turbojet blade-tip propulsion model takes shape from drawing boards . . . possible solution to large helicopter flight problems. Hiller experts on Army-Navy project are (l/r) C. W. Messinger, "Tip-Turbo" Project Engineer; J. B. Nichols, Manager-Advanced Planning. Hiller tip-propulsion experience includes thousands of flight hours with ramjet rotorcraft.

by **HERB FISHER**

International aviation authority, veteran test pilot, author

Mr. Fisher

"You just strap it on like skis, give it some throttle—and you've got your feet planted square in mid-air!"

That simple, says the test pilot who first "walked on air" with the unconventional ducted-fan Flying Platform strapped to his feet. You wonder how some of Hiller's research craft can fly . . . but then, aerodynamics is still puzzling the flight of the all-wrong bumble bee. He flies. And so does Hiller—with phenomenal success!

Founded in 1940 by 17-year-old mechanical genius Stanley Hiller, Jr., Hiller Aircraft Corporation is rightly famed for two things: Volume-supplying a vast military and civilian market with light helicopters noted for efficiency as well as operating and maintenance economy. And pioneering "years-ahead" flight concepts to *reality*.

Visionary Stan Hiller and his lab and design team sent aloft the world's first co-axial aircraft four years after the company's founding.

Next came this country's first jet torque-compensating 'copter.

Soon afterward, the unconventional Flying Platform. First of its kind. Completely revolutionary! Forerunner of a whole new era of ducted-fan flight (wait and see!) . . .

Then the 290-lb., collapsible, one-man XROE Rotorcycle. A virtual flying motorcyle! The Marines snapping up first test models . . .

And—the nation's first vertical takeoff transport, the VTOL/STOL X-18, a turbine-powered 33,000-lb. research giant currently under test at Edwards Air Force Base.

In the works at Hiller are more research craft destined to lift the eyebrows of old-time fixed-wing test pilots like myself (until we remember the bumble bee and Hiller's knack for taking the bugs out of "bumble bees").

Production-wise, backbone of the 61-acre Hiller operation at Palo Alto, Calif., is the Army H-23D "Raven" helicopter with its Lycoming VO-435 engine and the higher powered civilian version, the new 12E, with its 305-hp Lycoming. First deliveries on the lightweight, heavy-load-lifting commercial and business 12E began this Spring.

One of the many missions of the military-version Raven is primary trainer for all Army helicopter pilots. At Camp Wolters, Tex., world's largest helicopter operation, normal helicopter maintenance time has been slashed in half with a fleet of 200 Ravens!

Throughout these dramatic years at Hiller—from first light 'copters to as yet unannounced giants with turbojet blade-tip propulsion and second-generation jet-lift VTOL's—Hiller and Champion Spark Plug Company have worked together. Closely. Developing technology in the vital area of ignition—heart and lifebeat of any machine that flies.

With Hiller, the military, and the engine manufacturer, Champion developed and tested new plugs for new flight requirements. Hiller further subjected these—and competitive plugs—to torture seldom experienced by a plug in actual use . . . even though normal 'copter cruise conditions approximate continuously those of regular aircraft at full-power takeoff. The result of this torture-testing is one reason Champion today remains 'way out front in spark plug and jet igniter development—and preferred by the world's major airlines and business fleets.

I haven't got space to detail Hiller tests. But I'll tell you about one, the brutal "tie-down": Hiller straps 'copters and VTOL's to test pads and runs engines—day and night, without letup—at continuous full-throttle, then 85% power! I'm telling you! If everything isn't up to missile-age par—especially those vital plugs—you can imagine the results!

Any wonder, then, that Powerplant Design Specialist Bob David directs Senior Buyer Gene Sparks to *specify Champions* when ordering the various engines Hiller uses?

Hiller has had a personal hand in tailoring the *dependability* of those plugs to torturous requirements — as Hiller tailors its research craft to fly *right!*

CHAMPION SPARK PLUG COMPANY • TOLEDO 1, OHIO

Whisking heavy loads anywhere is duck's soup for the powerful new lightweight commercial 12E helicopter with its Champion-fired 305-hp Lycoming VO-540 engine. Compared with its predecessor, the three-place commercial-executive 12E will transport 65% more payload, 50 miles farther, and hover in ground-effect four times higher.

(ADVERTISEMENT)

HANGAR FLYING

VINTAGE OF OLD '42

THERE IT WAS, sitting in its black and white paint scheme, just recently washed, and gleaming in the sun. If love was ever blind, it was now as I admired the clean lines of the 1942 model Interstate Cadet.

Since small, two-place aircraft were in high demand in the south, it had taken weeks of searching before I found one that wasn't over-priced. Even then I had to trade in my car to get the necessary cash to purchase the plane.

It had a black sheep insignia painted on the sides by the former owner and I soon learned that the local pilots jokingly referred to it as "the Goat," but despite its

Author with his 17-year-old Interstate Cadet.

nickname, it proved to be a great performer. The "Goat" flew like a Champ and cruised out at 90 to 95 mph with the proper trim. Considering that it did this on a 65-hp Continental which burned less than four gallons an hour, it was really an economical cross-country ship.

As the months went by I had to spend approximately $50 for maintenance which went mostly for a cracked windshield and a corroded exhaust stack that had to be replaced.

Then I made a big decision. My annual vacation was only a couple of weeks away and I decided to fly the Interstate north to my home in Pennsylvania. Most of my former cross-country excursions in light planes were limited to flights of 300 miles or less and I had always wanted to undertake an extended trip in a small plane. I figured that this was my chance!

It was 0930 hours in the morning when the taxi got me to Lake Charles Municipal airport where I kept my plane. By 1000 hours I had securely stowed the baggage, checked the weather, pre-flighted the plane, and was rolling down the runway. Clearing the local traffic pattern, I climbed on a direct course to Natchez, Miss., my first stop 145 miles away. There was a light tail wind from the left quarter. In no time at all I was munching cookies and drinking a Coke while the line boy at Natchez refueled the plane.

From Natchez to Meridian, the flight was equally pleasant, I was flying over small, round hills now, and as I approached Birmingham, the rolling hills were slowly turning into small mountains. Getting the green light from the tower, I set down on the wide concrete runways of one of the nicest airports in the south and gassed up.

After taking off I had to circle to gain altitude before I headed north over the mountains to Nashville, Tenn.

Nashville was presently below my left wing and I made my letdown to the Cornelia Fort airport just northeast of the city. This was where I had planned to make my overnight stop and luckily got a free ride into town with one of the airport employees. After a savory dinner and a good night of sleep, I was ready to go again the next day.

The next hop was to Lexington, Ky., and then on to Huntington, W. Va. From Huntington I set my course for Pittsburgh and soon the terrain below started to become familiar. Landing at the Allegheny County airport in Pittsburgh I really felt that I was home, although I still had 90 miles to go.

Soon I was flying up the Allegheny River valley, passing over terrain that I knew like the lines on my face. The sun was hidden by thick nimbo-stratus and visibility was down to about three miles, the worse weather I had encountered throughout the entire trip. Turning due north at Brookville, my heart skipped a beat or two as I picked up a tailwind and the mountains raced by. Fifteen minutes later, I dragged the old farm strip near Marienville which had been used occasionally by lightplanes.

I touched down lightly and walked the remaining half mile into town and went through the back door. My parents were really surprised and couldn't believe that I had flown all that distance i: a small "box-kite."

The total distance was 1215 miles and took 15 flying hours. The Interstate burned 60 gallons of gas and one and one-half quarts of oil. The trip cost $24.55, excluding meals and hotel bill.

Need I say again that this trip really sold me on lightplanes for fast, safe and efficient transportation?

ROBERT D. REGINA

Lake Charles AFB, La.

A PLANE OF MY OWN

MOST PEOPLE have the idea that a guy on an ordinary salary can't afford to own and fly an airplane, but I'm here to say that they're wrong. I have the sweetest little 1940 BL65 Taylorcraft you ever saw. For a year now, I've flown it to work in Little Rock in the morning and back in the evening to my home in Conway, Ark., 35 miles away. This summer we built a new house with a hangar on the side. The plane's paid for, and the house will be before long.

And yet, I'm a linotype operator for Jordon Printing Company during the day. I do all right on the salary end, but nothing fancy. One of the requirements for a married man who goes into plane building is a patient wife who'll put up with temporary inconvenience. My Mary is all of that. I bought an old plane from a flying friend and rebuilt it myself—mostly from pieces, in the house. To hire outside help to put it in shape would have cost $1,000, but I did it myself in a year, for $300 and learned a lot.

When I got it, the engine was in good condition except for rusted exhaust

Where perseverance paid off in rich rewards.

stacks. Of course the old BL65 outperforms the later ones because it's quicker on the take-off. It's lighter, with two less gas tanks. But the rest of her was in a sad shape.

So I brought the T-craft to Conway, took a deep breath and dismantled her. We moved three times during the year, so I hauled the ship along. Friends who dropped in saw an aileron or two in the living room, rudder in the bedrooms, cabin doors in the kitchen, one wing in the garage and the other at the airport. The engine stayed on the frame. When I got the whole thing finished, I hauled it to the airport and had the local manager, Dennis Cantrell, make new exhaust pipe and assemble the pieces. But between the buying and the licensing was a long gap, and a lot of scrounging around.

The hangar on the new house worked out fine. When I'm ready to go to work, I taxi across the road to the airport and take off. In the hangar, which is 40 feet wide and 25 feet long (2 feet shorter than the house itself), there's room for the family Studebaker under one wing, a work bench, a tool rack, and some of daughter Kathy's toys.

CLYDE B. MCKENNON
as told to ANN FARIS

Conway, Ark.

CANNY CREW

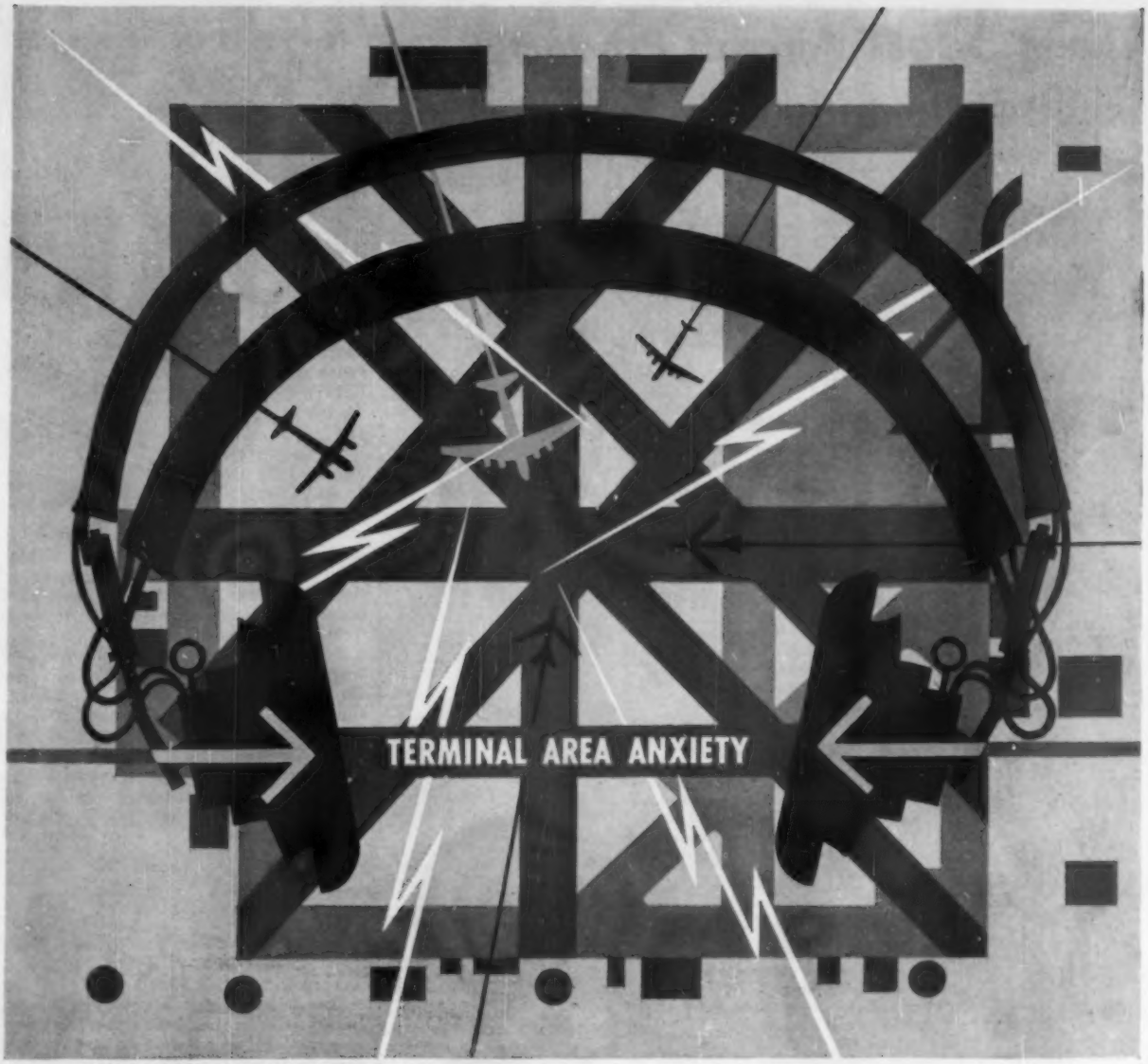
LAST WINTER an American officer, flying to Bagdad with three crew members and two, recently-purchased Boxer dogs, ran out of gas. Unable to land because of fog, he set the plane's automatic pilot and bailed out with his crew, leaving the dogs in the plane.

Anatolian peasants saw an airplane come through a narrow gap in the hills, glide down a long valley and make a perfect landing in a flat field.

The word has spread through the hills of Anatolia. Turks stride with new confidence along the bank of swift Kizil Irmak. They know now that the Russians can never win. For those incredible Americans have now trained dogs to fly airplanes.

H. N. FERGUSON

Brownsville, Tex.



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HAVE YOU READ?

BY JAMES F. SUNDERMAN

THEY FLEW THE ATLANTIC, by Robert de la Croix (W. W. Norton, $3.95).

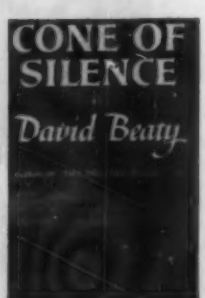
The deeds and accomplishments of early air pioneers are no less amazing than the latest achievements in jets and missiles.

British writer Robert de la Croix records the individual accounts of transatlantic air pioneering from the first unsuccessful attempt by Robert Wellman in the crude dirigible "America" on October 15, 1910, to July 5, 1937 when two hydroplanes made the first commercial crossing, Ireland to Newfoundland and return. With these two flights, writes de la Croix, "pioneering Atlantic flight was over. The Atlantic was harnessed, and . . . regular service in each direction was being run."

De la Croix's stories tell of success and tragic failure. Many are well known like the tales of the NC-4, Alcock and Brown, Lindbergh, Levine and Chamberlin, Ruth Elder, George Haldeman, Amelia Earheart, Kingsford-Smith, and the Graf Zeppelin. Others are all but forgotten in the dizzy race of modern technology. But all played a part in paving the way for the comfort and safety we now enjoy in transoceanic flight.

CONE OF SILENCE, by David Beaty (William Morrow, $3.95).

This fourth major novel by a former BOAC pilot probes inside the hierarchy of a mythical major modern airline company to reveal the cross-currents of tension, pressure, jealousy, loyalty and internal petty politics which interplay among the small number of pilots qualified for jet duty, and the over-riding obsession of the management to be "first" in the jet business.



George Gort, Senior Captain in British Empire Airways' piston engine fleet, checks out in jets and early has a non-fatal take-off accident in the "Phoenix," newest multi-jet airliner, pride of the British aircraft industry.

Collusion between British Empire Airways (which operate the Phoenix) and Atlas Aviation (builders of the giant new jet) assures that the Official Board of Inquiry charges Gort with pilot error.

But Hugh Dallas, senior jet training

(Continued on page 77)

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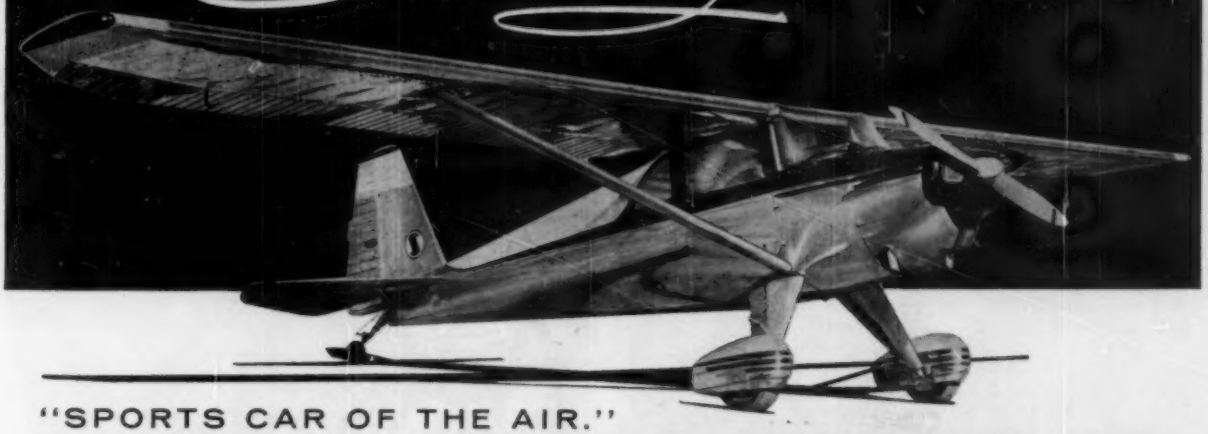

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Major Mannock, in his S.E. 5A, outwits overwhelming odds by pretending to be hit.

Early War Birds— THE S.E. 5A

The S.E. 5A was one of the outstanding British fighters of World War I. When fitted with a 200 h.p. Wolseley Viper engine, it had a maximum speed of 132 m.p.h. at 6500 feet, a ceiling of 20,000 feet, and an endurance of 2½ hours. Although it lacked the quick maneuverability of some designs, the S.E. 5A more than made up for this failing by its extra speed in level flight, great inherent stability, and a structural strength that permitted diving at high speeds. Armed with a synchronized machine gun on the cowling and a Lewis gun on the top wing, the S.E. 5A was a remarkably stable "gun platform" that permitted accurate shooting, even at extreme range.

Of all the great British fliers who flew S.E. 5A's—McCudden, Ball, Rhys-Davids—none was more admired than Major Edward "Mick" Mannock . . . a leading allied ace with 73 victories. Aside from being a skilled pilot, an accurate marksman and a master tactician, he was a good leader who watched over and nursed novice pilots in combat.

In one recorded incident on May 28, 1918, Mannock made himself a "sitting duck" to save a comrade being harassed by a flight of Pfalz. His less experienced companion got clear while Mannock held the Germans off. He then made his escape by pretending to be hit . . . spinning down on his back, apparently out of control. When his pursuers pulled up to watch him crash, Mannock pulled out and made for the Allied lines in a long dive.

A month later, while escorting a new pilot on an indoctrination flight over the lines, Mannock was killed by a bullet from a German infantryman. He remained to the last, unconquered in the air.

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FLYING CALENDAR

June 28—Sixth Annual Ranch Style Fly-in Breakfast, Bluffton Airport, Bluffton, Ohio, sponsored by the Bluffton Flying Club.

June 28—Air Show sponsored by Annapolis Sq. CAP, at Lee Airport, Annapolis Md. Contact: Donald C. Parlett, Ch., Edgewater, Md. Rain Date: July 4.

June 29-July 31—1959 National Aviation Education Workshop at Montana State Univ., Missoula, Mont.

July 1-11—Twenty-sixth Annual U. S. National Soaring contest at Harris Hill, Elmira, N. Y. Contact: Elmira Area Soaring Corp., Federation Bldg., Elmira, N. Y.

July 4—Dedication of Olney-Noble Airport, Olney, Ill. Everyone is cordially invited to fly in—special inducements to antique aircraft and homebuilt aircraft. For details, write: R. A. McGregor, P. O. Box 535, Olney, Ill.

July 4—Third annual Western Montana Air Fair at Missoula, Mont., in conjunction with 1959 National Education Workshop at Montana U. (Rain dates: July 5 or 11.)

July 4, 5—Fly-in picnic and open house to celebrate opening of Sportsman's Ranchaero, Illinois Valley Airport, in southwestern Oregon. Write: Lin Smith, 6918 Lasaine Ave., Van Nuys, Calif.

July 4-5—Fly-in Air Fair, El Mirage Airport, Adelanto, Calif. EAA Experimental, Antique Airplane Assoc. planes on display. Pit Barbecue on Sat. evening. Contact: Cecil R. Campbell, EAA Ch. 49, 1250 E. Ave. R-2, Palmdale, Calif.

July 4-8—The 1959 All-Woman Transcontinental Air Race starting from Lawrence Municipal Airport, Lawrence, Mass., terminating at Felts Field, Spokane, Wash. Impounding deadline for all racing aircraft, 1 July. Write AWTAR Hq., 2611 East Spring St., Long Beach 6, Calif.

July 5—Fiesta Flight Breakfast, Montevideo, Minn.

July 5—Dawn Patrol at Custer Airport, Monroe, Mich., sponsored by local CAP Sq..

July 9-11—Fourth Annual Fly-in Fishing Tour to East Trout Lake Lodge, Molanosa, Sask., Canada, sponsored by Saskatchewan Flying Farmers and open to all Flying Farmers. Contact: Henry Hoffman, East Trout Lake Fly-in Fishing Lodge, Molanosa, Sask.

July 12—Fly-In Breakfast at Andrews County Airport, Andrews, Tex. 0600 to 1100, sponsored by Mustang Flying Club, Inc. Lots of prizes.

July 12—Fly-in to Pacific City airstrip to attend Old timer car parade and Pioneer costume contest sponsored by Pacific City-Woods Area Chamber of Commerce (Ore.).

July 12—International Air Show, International Airport, Vancouver, British Columbia, honoring Canada's 50th Anniversary of Powered Flight. Golden Flight Committee, 1450 W. Georgia St., Vancouver, B. C., Canada.

July 12—Annual Aviation Day and Flight Breakfast at Mason City (Iowa) Municipal Airport, sponsored by the Mason City Ch. of Commerce. All pilots and aircraft invited.

July 14-19—Sportsman Pilots Association Air Cruise to Thousand Islands Club, Alexandria Bay, N. Y.

June 14—Annual Fly-in Breakfast at Oshawa, Ontario, sponsored by the Ontario Cy. Flying Club. Open to all. Experimental and homebuilts welcome. Customs available for U. S. visitors on 24 hr. advance notice. Participation must be confirmed by 7 June. Radio (Unicom 122.8) and signal lamp control of traffic. Phone RA 8-1626.

July 18—International Air Fair at Houlton International Airport, Houlton, Maine, sponsored by the International Flying Club. Program will feature RCAF, USAF, Army and the Navy Blue Angels.

July 18-19—Ranch Style Whole Steer Barbecue, at ranch of John Beadell, Canim Lake, British Columbia. Wheels and floats. Bring sleeping bags. Write, Aero Club of B. C., Vancouver Airport, B. C., Canada.

July 19—Dedication of Antigo, Wis., Municipal Airport including Breakfast Flight, Cole Bros. Airshow, Commercial and military exhibits. Contact, Len Spychalla, Rte. 2, Antigo, Wis.

July 19—Seventh Annual Fly-in Breakfast sponsored by the Pottstown Unit, AOPA at Pottstown Airport, Limerick, Pa. Rain date: July 26.

July 19—Annual Dawn Patrol at Haines Airport, Three Rivers, Mich., sponsored by The Aviation Club of Three Rivers and the Three Rivers Chamber of Com.

July 23-25—Missouri Flying Farmers State Convention at Ambassador Hotel, St. Louis, Mo. For reservations, write: David Waldemar, 35 St. Celeste Dr., Florissant, Mo.

July 26—Jaycee Air Fair at Hillsboro (Ore.) Airport celebrating Oregon's 100th birthday, sponsored by Portland Jr. Ch. of Commerce. Field will be closed approximately two hours with 10-minute openings every 20 minutes, starting at 1100. Radio facilities and light control available at all times.

July 26—Free Fly-in breakfast at Municipal Airport, Faribault, Minn., sponsored by Faribault Pilots Assoc. (Rain date—2 Aug.)

Aug. 4, 5—American Astronautical Society 2d annual western regional meeting at Ambassador Hotel, Los Angeles, Calif.

Aug. 6-9—Seventh International Fly-in and convention of the Experimental Aircraft Assn., Greater Rockford Airport, Rockford, Ill. Write: Paul Poberezny, EAA, Hales Corners, Wis.

Aug. 6-9—Sport and Civil Aircraft convention at Greater Rockford Airport, Rockford, Ill., sponsored by Experimental Aircraft Assoc. of America.

Aug. 8-13—Seventh Annual Jaycee Air Cruise Las Vegas-Philadelphia for single and twin engine aircraft. Fee $30. Contact: Bob Carson, Jr. Ch. of Commerce, 121 S. Broad St., Phila. 7, Pa.

Aug. 8-16—International Aviation & Industry Show at The Coliseum, New York, N. Y.

Aug. 9—Watervliet Dawn Patrol at Watervliet Airport, Watervliet, Mich., sponsored by CAP Sq. 639-4.

Aug. 9—Breakfast Flight at Fort Dodge (Iowa) Mun. Airport from 0630 until noon. For details, write: Dodger Flying Club, P. O. Box 465, Fort Dodge, Iowa.

Aug. 10-14—National Flying Farmers Convention, Fort Collins, Col.

Aug. 15, 16—Grand Western Canadian Owners and Pilots Association Elk Barbecue and Fly-in at Rocky Mountain House, Alberta, Canada. Write N. J. Armstrong, 1603 Center St., N. Calgary, Alberta, Canada.

Aug. 15, 16—Third Annual Maine Air Fair at Auburn (Maine) Mun. Airport, sponsored jointly by Southern Maine Aero Club and Auburn Exchange Club. Economical package deal for weekend at nearby Poland Spring Hotel, incl. cocktail party, dinner-dance and lobster cookout. Military and civilian aviation program includes sky diving glider demonstrations, etc. Tie-down and float facilities. Write: Maine Air Fair, Auburn, Maine.

Aug. 16—Huckleberry Festival Fly-in at Trout Lake, Wash., south base of Mt. Adams, elevation 1,950 ft. Packed runway 2,000 ft. Whole beef barbecue—prizes galore. Free transportation to huckleberry fields and scenic points; fishing and hunting unexcelled. Contact: R. H. Crothers, Box 915, White Salmon, Wash. Phone: HY 3-2873.

Aug. 16—12th annual Fly-In Breakfast, at Estherville, Iowa. Free breakfast, 0500 to 1000, free prizes, entertainment, sponsored by Estherville Chamber of Commerce.

Aug. 22—Round robin efficiency race sponsored by the St. Louis Aero Club (NAA) from Alton, Ill., Civic Memorial Airport to Arrowhead Airport, St. Louis Cy., Mo. Cash prizes, trophies. Entry fee: $10 and membership in NAA. Rain date: Aug. 29. Contact: Mr. Lackland Bloom, 506 Olive St., St. Louis 1, Mo. Phone: Garfield 1-667.

Aug. 22, 23—Keene (N. H.) Air Show Air performances including jets. Saturday night barbecue, dancing and fireworks displays. Special overnight accommodation rates for fly-in transients. Write: Keene Ch. of Commerce, 95 Main St., Keene, N. H.

Aug. 30—Lincoln Year Air Show, Huntingburg JayCees 5th annual, affiliated with Indiana Lincoln Sesquicentennial. Fly-in Tour and breakfast at Lincoln Park and Santa Claus Land with tremendous Air Show in afternoon at Huntingburg (Ind.) Airport.

Sept. 3-6—Air Force Ass'n convention and Panorama, Miami Beach, Fla.

Sept. 5-7—Ninth annual Kentucky Jaycee Air Tour. Free aviation gas. Many of events are sponsored. Write: Kentucky Jaycee Air Tour, 670 South Third, Louisville, Ky.

Sept. 6—Second Annual Air Show sponsored by Louisville Jr. Ch. of Commerce, Bowman Field, Louisville, Ky. Huge air show and fly-in. All types static displays and flying demonstrations. Write: John E. Stout, 1010 Republic Bldg., Louisville, Ky.

Sept. 7-13—Society of British Aircraft Constructors, annual flying display and exhibition, Farnborough, England.

Sept. 8-11—Second Annual Flying Physicians Clinical Sessions at Western Hills Lodge, Sequoyah State Park, Wagoner, Okla. Contact: Nat'l Hq., P. O. Box 3275, Tulsa, Okla.

Calendar items must be received at FLYING's editorial offices, 1 Park Avenue, New York 16, N. Y., three months prior to the event.

PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA

Specialists in rugged flying

Dropping supplies to Colorado river boats... flying emergency patients from the Navajo Reservation . . . patrolling timbered areas for the Forest Service . . . scouting pipe lines... flying search missions... these are strictly routine assignments for W. C. (Tex) Wright and his wife, Beth.

As owners of the Wright Flyte Service, based in Flagstaff, Arizona, this couple hauls anything . . . anywhere . . . in the rugged badlands of the Utah-Arizona border. No matter what the purpose, their flights usually have two things in common: they are over wildly remote areas, and the landing strips (if any) are merely dirt tracks.

"We use our planes—but hard!" says Mr. Wright. "That's why we protect 'em with RPM Aviation Oil Compounded. Take our Cessna 182, for instance. After 1250 hours of operation, we pulled its engine (a 230 HP Continental) for a major, and found the *only* parts that showed wear were one wrist pin, and a lobe on the cam shaft!

"The crankshaft was within new limits, and — in all this time — the engine had fouled only two spark plugs, and was using no more than the normal amount of oil. In fact, it was running as though it had only 250 hours of time. What other oil can measure up to this?"

TIP OF THE MONTH

When using dusty strips, Mr. Wright suggests keeping an extra air cleaner on hand— to change when the first sign of dirt appears. It's good insurance against repair bills... or worse.

We take better care of your plane

CHEVRON AVIATION FUELS

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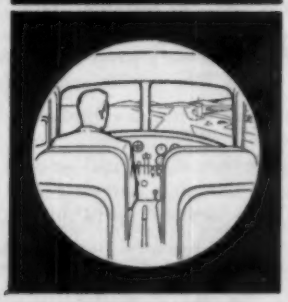
T.M.'s "RPM," "Chevron," "Plane Fax," Reg. U.S. Pat. Off.



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AIRPOWER ARTICULATE

GILL ROBB WILSON
Editor and Publisher

THE World Congress of Flight was a shot in the arm from a number of angles. Uniquely, it held up a mirror to NATO airpower—something the average American understands about as well as the theory of relativity. Additionally, the week of airwise activity at Las Vegas found American aviation portrayed on a broad front. This was a reciprocal course to that which its various segments and interests have been flying of recent times. In fact, one often had to doubt that an industry so socialized, regulated, segmented and trussed in the toils of bureaucracy still retained enough vestige of incentive to coordinate its several parts and move as a whole. The World Congress of Flight showed a smoldering spark still warm in the ashes, although it did take a lot of puffing and blowing to brush aside the cold punk and get down to the living embers. Thank the Lord for such unfettered citizen organizations as the Air Force Association and its co-sponsors of the World Congress. They may move awkwardly and fitfully at times but without such as they, the clammy hands of sheer dollar greed and the bloodless fingers of the bureaucrats would have choked the zest out of American life long ago. And all the scientific progress and industrial prosperity for which we strive in the United States is meaningless if it has no purpose related to the spirit and happiness of the individual.

Well, now I've got that off my chest—and I feel better—I've known this aviation world since before it had one bureaucrat to rub against another and, although its spirit is a pale shadow of the colorful and courageous thing it once was, the flying and sweating and struggling of the program at Indian Springs Gunnery Range and McCarran Field and Nellis Air Force Base and in the big colosseum in Las Vegas brought a glow to an old airman's heart.

In pertinent respects the Congress was a remarkable show. The industrial exhibition was the best portrayal of scientific and engineering achievement ever staged in this or any other country. The flight demonstrations—there were three sessions of them—NATO military airpower at Indian Springs Gunnery Range—commercial jet transport at McCarran Field—general aviation from the Las Vegas fairground—revealed airmanship and aircraft performance that testified to a new plateau of utility. Exceptionally productive from a long range standpoint were the forum sessions of the educators who for the first time were attending an aviation event as a component part of the program and in representative numbers. State Superintendents of Education, several of them accompanied by their Governors and staff members were conspicuous. One remarkable touch was the fact that the teaching force of Las Vegas, some 500 of them, took a day off from school and, in their personal cars, shuttled the Congress delegates (there were more than 6,000 of them registered) from Las Vegas to the Gunnery Range, on the occasion of the big NATO airpower demonstration. Other local touches of highest order were the top performances put on by the management of McCarran Field and of the Alamo Airways staff. We who have a knowledgeable interest in general aviation were especially impressed by their operational smoothness.

In retrospect, one can see numerous points at which the World Congress of Flight might have been tightened up and streamlined. On the other hand, it is hard to imagine how a better program could have been originally planned and carried out. The chasm of ignorance existing between the several segments of aviation, civil and military, airlines and general aviation, "big" industry and grass roots activity, is best symbolized by the Grand Canyon. It's colossal beyond belief. Organization of any such undertaking as the World Congress of Flight had to face this factor. It was remarkably well done, and the doing showed how sorely it was needed.

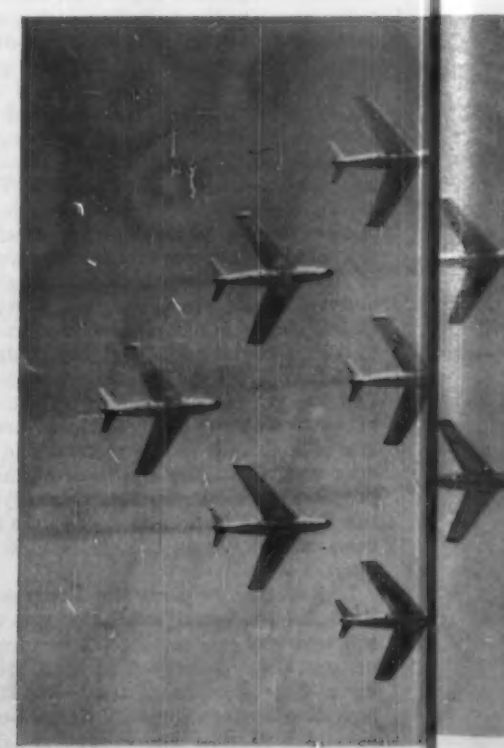
If suggestion is in order, it would seem to the writer that the World Congress of Flight, staged perhaps every third year on this side of the Atlantic in alternate staging with Britain's Farnborough and the Paris Air Show in Europe well might serve not only American aeronautics and astronautics but the entire free world. The question is something that should be taken up at the highest levels of NATO as well as with the component parts of aviation in America.

On one occasion during the Congress program, the very astute Dr. Edward Teller, father of the hydrogen bomb, remarked to me that he had always admired aviation's ability to interpret its larger meanings to the people; and added that he envied this articulateness in behalf of his field of nuclear physics.

I do not know how more plainly or simply the value of the World Congress of Flight could be stated than as the articulate unity of free airmen voluntarily voiced.

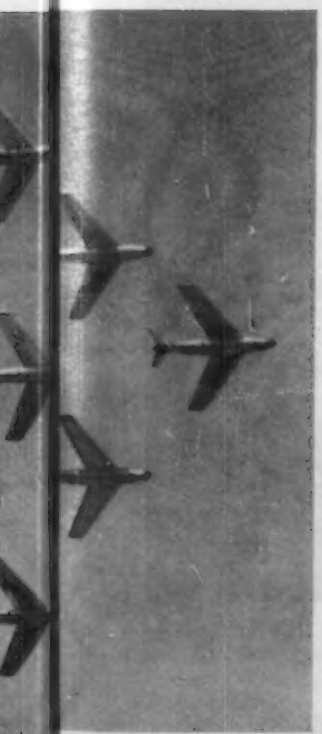
REPORT ON THE WORLD CONGRESS OF FLIGHT

The first space pilot was there . . .



Fighting power was there . . .

Jet age transportation was there . . .



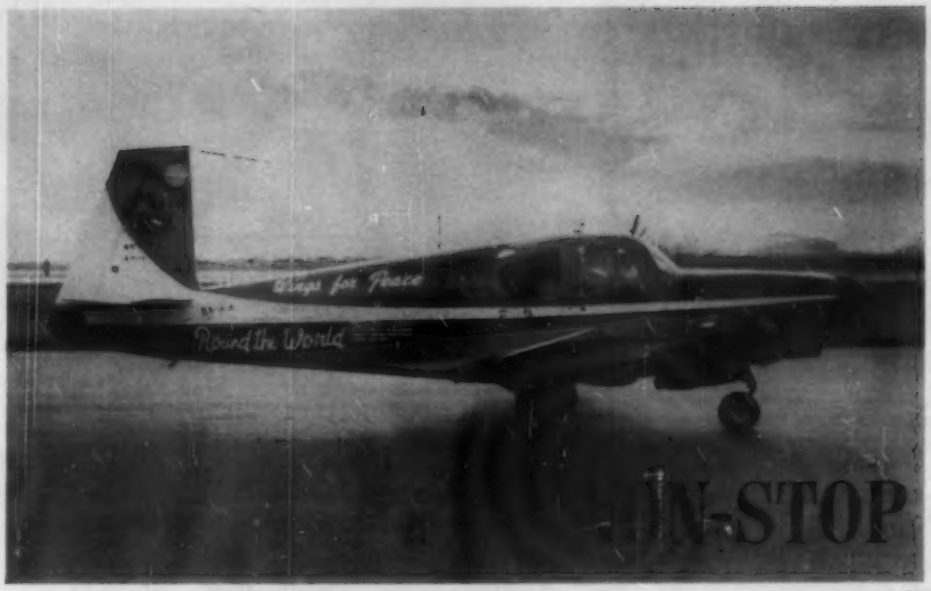
The missiles were there . . .

The brass was there . . .

Science was there . . .

The future spaceman was there . . .

The people were there . . .



Mooney 46 Baker is a traveller of considerable note and on this flight almost broke the non-stop distance record.

NON-STOP TEXAS TO ENGLAND

Flying a dead reckoning course on the great circle route across the North Atlantic can be memorable.

By BILL MULLEN

THE LONG DISTANCE RECORD for aircraft weighing 3,858 pounds or under, set by Bill Odom in 1949, had stood for too many years. For a little while last March it looked as though Mooney 5246B would break it.

Specially equipped for the long distance flight with a Lycoming 0-540, 250-hp engine, Mooney 46 Baker's cabin was crammed with fuel cells to boost total capacity to 300 gallons, and a fuel-flow meter calibrated consumption to the last drop. Other equipment included a mighty fine Mitchell autopilot, a Collins Transceiver, an ARC ADF, and a Narco Mk II Omnigator.

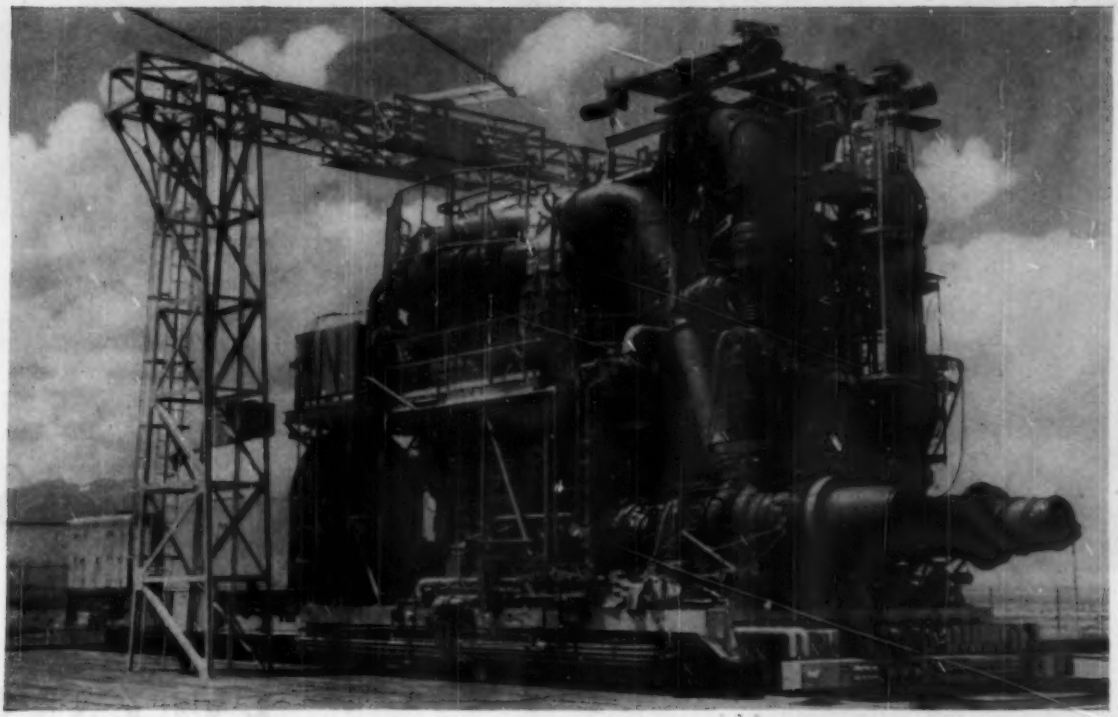
It was 1830 CST on March 18th and I had just talked to Bill Kelly, TWA's New York Chief of Dispatch. Weather for my proposed non-stop trip from Houston, Tex. to Rome, Italy looked ideal for the next morning. "You should have tail winds and VFR all the way," was Kelly's comment. After a short discussion with Hal Rachal, Mooney Aircraft's president, the decision was made for a morning take-off. At 0635 CST, Mooney 5246B, "Wings for Peace," broke ground after a relatively short run considering its 1,400 pounds overload of gas, and headed northeast from Houston.

The great-circle track from Houston to Rome heads northeast to New York and breaks landfall at Boston. Bending east across Nova Scotia, it cuts the southern tip of Newfoundland, and then heads southeast across the North Atlantic to landfall in the Bay of Biscay on the coast of France. It cuts across southern France, passing over Nice, the northern tip of Corsica, and terminates at Rome.

Weather to New York was just as Kelly had predicted with light tailwinds giving an average 10 mph gain. Approximately 10 hours after take-off, I switched to TWA's New York frequency, my morale at high ebb until Kelly reported, "There are two strong low pressure areas developing rapidly in the North Atlantic. Your course will take you through the northern edge of both. Suggest you take a rhumb-line route out of New York via the Azores."

The author, left, checks equipment with Hal Rachal, president of Mooney Aircraft, prior to take-off for Europe.

A quick check of the charts showed this would add too much mileage so I continued on the great-circle route. Over Boston and heading out over the Atlantic, the setting sun reflected on a bank of clouds lying low to the east. By the time I hit Yarmouth Radio, first check point in Nova Scotia, I was in an overcast (*Continued on page* 74)

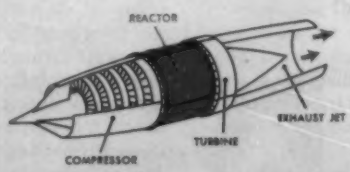


The successfully operating HTRE-1 or core test facility for an atom-powered airplane engine at AEC's National Reactor Testing Station.

CRADLE OF THE "A" ENGINE

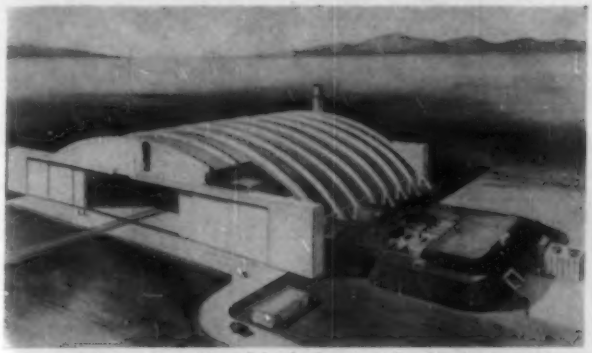
WHEN WILL WE PUT the first atomic-powered plane in the sky? The time is indefinite, but out on the sagelands of southeastern Idaho extensive progress is being made to that end.

Rising on the open plain at the Atomic Energy Commission's National Reactor Testing Station near Idaho Falls is a building whose function is to cradle this new wonder of the world. When completed in the fall of 1959, the structure, which is the major unit in the $6,044,208 project to provide an Atomic Flight Engine Test Facility, will be one of the largest, if not the largest, single-arch buildings in existence. Of hangar-like design, the building has ribs extending 411 feet from base to base, each able to withstand a horizontal thrust of a million pounds. Within, it has a peak height of 99 feet, a length of 320 feet and a width of 234 feet. Commented an engineer on the project: "Orville Wright could have made his first flight inside this building!"



How a direct cycle atomic-powered aircraft engine is expected to operate.

The building, however, is not for flying, but for the intricate research which must precede nuclear-powered flying. Atomic decisions usually call for high-powered brain work, but not much cogitation was required to select the Idaho site for the Flight Engine Test Facility. Here at the $150,000,000 plant, sprawled over 431,000 acres of desert, was spawned the prototype of the atomic submarine *Nautilus*, which took the North Pole short-cut under ice. It is here too, that experiments are being conducted to power large surface ships with atomic energy. On October 21, 1958, the first of two nuclear reactors of the prototype powerplant for the ships "achieved criticality"—a term for the completion of nuclear chain reaction. The ships themselves are already under construction —the guided missile cruiser, U.S.S. *Long Beach*, at Quincy, Mass., and the

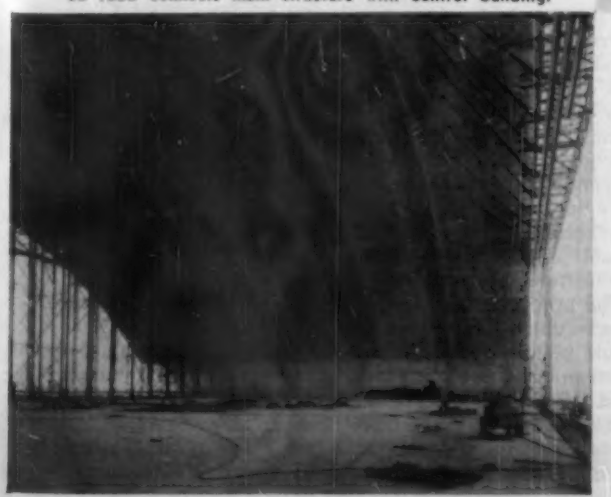


Artist's conception of finished project for developing nuclear-powered aircraft at National Reactor Testing Station. Shielded control and equipment building at right. Below: The giant structure under construction, completion date—Fall, '59.

The development of a nuclear propulsion engine is a complex business, requiring a very special kind of environment.

By RAFE GIBBS

Each rib of the massive Flight Engine Test Facility building extends 411 feet from base to base, should withstand a horizontal thrust of 1,000,000 pounds. Right: This shielded road connects main structure with control building.



aircraft carrier, U.S.S. *Enterprise*, at Newport News, Va.

Operation of the first of the two reactors caused Vice Admiral Hyman G. Rickover, chief of the Naval Reactors Branch, AEC, to declare: "No man can visualize where we can go with these reactors. With nuclear-powered cruisers, destroyers and aircraft carriers, we will find uses undreamed of before. Peace-time application? A reactor doesn't know whether it's on a military or merchant ship."

What NRTS, with its 15 operating reactors, and eight more abuilding, could do for sea travel it should be able to do for air travel. Admittedly the assignment is more difficult, but the target is one that has been posted in the minds of scientists ever since the first atomic explosion. Dr. D. R. Shoults, general manager of the Aircraft Nuclear Propulsion Department, General Electric Company, which is under contract to the AEC to put the atom on sky duty, explained the major problem this way:

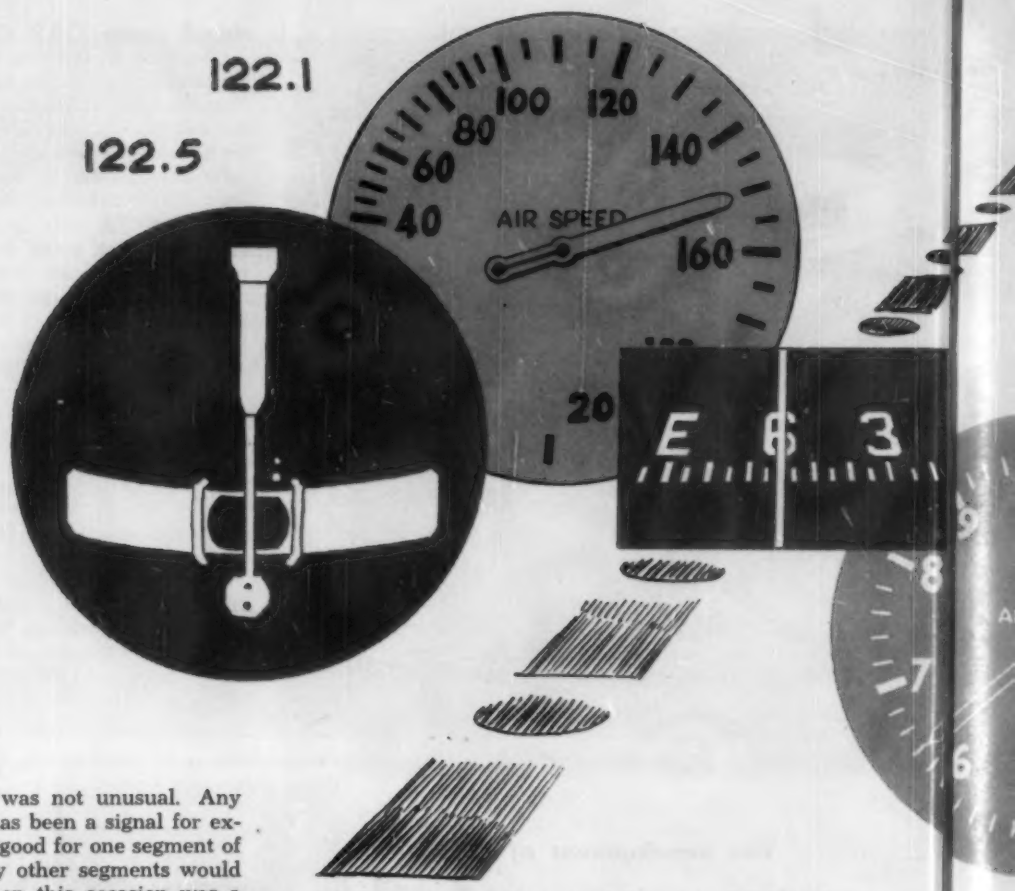
"Development of an aircraft nuclear propulsion system is complex because this type of system, to be useful, requires generation of large amounts of heat from a nuclear reactor of very small volume. This heat source must be combined with proper turbomachinery, controls, accessories and shielding to protect aircraft components, cargo and passengers, and crew from nuclear radiation. All these requirements must be provided within very stringent weight limitations."

On a craft the size of the *Nautilus* these problems were not so great, and the methods of solving them have been spectacularly successful. The *Nautilus* has now traveled well over 100,000 miles. Cdr. Richard F. Dobbins, chief medical officer of the *Nautilus*, recently reported: "The crew receives less radiation dosage at sea than the average American does in the course of daily life. The most common complaint of the atom-propelled seamen is colds."

In 1951, the AEC first announced that preliminary studies had shown the feasibility of nuclear-powered flights. The AEC and Defense Department jointly sponsored several contracts to develop studies leading to the flight stage. The projects went through a period of component-parts studies, then, in 1955, the Initial Engine Test Area was established at NRTS in Idaho; and in January of 1956, the first jet engine was driven by heat from a reactor. That was a tremendous step.

A standard jet engine contains a turbine-driven compressor, a fuel combustor, and a discharge nozzle. Air entering the engine is compressed in the compressor, heated in the fuel combustor, and exhausted through the turbine and discharge nozzle to the atmosphere. The hot jet of air and combustion products leaving the discharge nozzle provide the forward thrust to the engine.

An atom-powered jet engine operates the same way—except that the air, instead of being heated in a fuel combustor, is heated in a nuclear reactor. The atom is going through its splitting process in that reactor. This system is known as the "direct-cycle approach." Additional contracts have been let by the Defense Department and AEC at other sites for development of the indirect approach in which compressed air is heated as it passes through a heat exchanger system, containing liquid-metal coolant from the reactor. Extensive prog- (*Continued on page 56*)



LAST YEAR revisions which would have required some instrument instruction as a prerequisite to application for Private and Commercial Certificates were proposed to CAR, Part 20.

The proposal resulted in a flood of arguments from every conceivable source. This was not unusual. Any regulatory proposal historically has been a signal for explosive controversy. If it seemed good for one segment of the aviation industry, then surely other segments would cry "murder." The controversy on this occasion was a little unusual and perhaps appeared irreconcilable because sentiment for and against the proposal was about equally divided.

A review of the arguments pro and con reveals a wide disparity in basic training concepts. And none indicate that they were based on a thorough evaluation of the impact such a regulation might have on pilot proficiency or flight safety; or on the economics of flying either for pleasure or profit.

Some opposed the regulation on the theory that a little knowledge of instruments might be worse than none at all. Of course, that brand of logic could be used to ground many current holders of private and commercial pilots' certificates.

Some claimed that pilots who are properly cautious never get into the difficulties that the proposal is intended to eliminate. Well, a lot of pilots who certainly are anything but cautious never got into bad weather difficulties either. Many pilots do, however, get into difficulties with low ceilings and limited visibilities long before they have acquired sufficient experience to recognize the imminence of their danger. Therefore, caution alone is not the answer.

In support of the proposal, some voiced the opinion that five hours of instrument instruction would demonstrate to the pilot in what weather he could or could not fly safely. Well, maybe. That presumes something about the pilot's knowledge of meteorology. This cannot always be relied upon.

By others, the argument was advanced that "you cannot make an instrument pilot in five hours" and, if you did, he'd soon forget what he learned for lack of practice, so what good is the training? The validity of this argument depends on what is meant by "Instrument Pilot."

Complaints also mentioned the cost of the necessary "instrument" equipment. However, only those aircraft used in commercial pilot training would require "full panels." The others could qualify with a minimum of additional instrumentation. Viewed in the right light, the investment would constitute insurance of the highest order. After all, it is frequently the school's airplane that gets cracked up. And, relatively few new production aircraft are sold minus "instrument panels."

The arguments, either for or against the proposal, are in a large measure "irrelevant, incompetent, or immaterial." In fact, the authors must have disregarded some basic facts that are of immeasurable importance. The people offering these comments undoubtedly have considered "instrument" flight solely as a substitute for the standard flight control methods. And they must believe that control by instruments was intended to be utilized only when adverse weather conditions prohibited contact flight. This is a pretty antiquated viewpoint.

A good many critics have failed to concede that the preponderance of pilots, both private and commercial, have due regard for safety; have a reasonable amount of intelligence; exercise at least average judgment; and are capable of accepting and retaining properly planned and administered instruction.

The proposal is clear and definite enough, but the reasons behind it are subject to diverse interpretations. There would be less diversity if we all agreed on a definition of "instrument training." The term can cover a fairly broad field. Maybe it should be narrowed a bit, or at least clarified when applied to the training of private and commercial pilots. Isn't there some distinction between "instrument navigation," "instrument low approach procedures,"

Basic attitude instruments instruction in training programs would materially improve safety and the capabilities of pilots.

COL. E. A. "PETE" GOFF, JR., USAF, Ret.

INSTRUMENTS

"basic attitude instrument flight," "flight management under instrument conditions," meteorology," "traffic control procedures," and "air-ground communications procedures?"

Most training establishments offering instrument instruction have combined all of these departments in a single curriculum because their courses are predicated on the issuance of an instrument ticket. These subjects, therefore, have erroneously come to be considered under a single title. Let's forget "instruments" for the moment and just consider some less generally recognized *contact* training requirements.

Air-ground Communciations Procedures: Two-way radio has progressed from an unreliable, expensive and seldom used luxury to a highly reliable, relatively inexpensive, almost indispensable safety aid. In gradually expanding areas, two-way radio, even for "contact" operations, has become a necessity. A very high percentage of aircraft are now equipped with good radio equipment. Isn't it reasonable then to require "contact" pilots to understand the rules, regulations and procedures that apply to its use?

Traffic Control Procedures: There isn't much about traffic regulations applying to IFR flights that does not also apply to VFR flights in an increasing number of areas in the country. Air traffic is on the increase everywhere, and increasing traffic eventually requires control. Surely we should require "contact" pilots to know as much about air traffic regulations and procedures as they are required to know about automobile traffic rules. Shouldn't they know how, where, when or why they should file a flight plan?

Instrument Navigation: ADF, Omni, and Vortac stations pretty well cover or will soon cover the country. Equipment for their use is becoming available at constantly lowering prices. A large percentage of the aircraft available to private pilots is already equipped and the percentage is rapidly on the upgrade. VFR cross-country is certainly easier and safer when properly navigated. Shouldn't every pilot flying contact really understand the use of these navigation systems?

Meteorology: Every novice pilot should at least know enough to come in out of the rain.

All of the foregoing subjects have, at one time or another, been taught with varying degrees of concentration in our "contact" method, private pilot ground school courses. Their importance in Private and Commercial categories has been somewhat minimized presumably for the reason that aircraft with radio, omni and ADF equipment were not available to many private and commercial pilots, and perhaps because such a large portion of private flying is VFR and "Local."

The proposal served to emphasize the importance of these ground school type subjects to private and commercial pilots. And the emphasis was certainly justified. Certainly no one contemplated requiring an applicant to execute an instrument low approach or to pass the flight test or written examination prescribed for issuance of an instrument rating. This would have required, as we all well know, far more than the five to ten hours covered in the proposal. Actually it covered a very limited amount of "attitude instrument" training. All other issues aside, five hours would permit teaching the fellow, solely by reference to instruments, to hold an altitude at least within plus or minus 300-400 feet, maintain direction within plus or minus 15 degrees, and hold his air speed within plus or minus 20 mph. It would also permit teaching him to make a 180-degree turn, sloppily maybe, but at least without spiralling into the ground.

Experience has proven that five hours of properly administered "attitude instrument" training will do far better than the performance figures just mentioned. But above all, the training proposed would improve the student's contact flying ability tremendously and this might well be the proposal's greatest virtue.

Let's consider just basic control of the aircraft by reference to instruments alone and see where we stand today. Any airplane can be more accurately flown by reference to instruments than by "contact" methods. In fact, a great many airplanes cannot be flown with any reasonable degree of accuracy except by reference to instruments. The higher the performance characteristics the greater the necessity for instruments, but even the simplest light aircraft can be flown more satisfactorily when equipped with flight instruments; and the more proficient the pilot "on instruments," the more accurately the plane can be flown. Who will deny that precise control of an aircraft has an extremely favorable influence on flight safety?

The points at issue are "how many instruments, how much and when should we (*Continued on page 60*)

THE AIRMAN'S WORLD

From the days when Newark Airport, first modern facility to serve New York, was a shifting strip of cinders on a city dump to the day when air traffic control curtailed sightseeing from above the fabulous waterfront, we pilots saw a lot of "The Old Girl."

Tourists who had the fortitude to ride out over the bay behind our sputtering engines all wanted to circle the Statue of Liberty. It was a way for us to make a buck. And it was something more. A young fellow developed a feeling for the lady who stood in the dark water and held up a torch. When he circled her enough times to win her confidence, she might remind him that he could have just as much freedom as he was willing to pay for and not one degree more. It's worth a lot of circling to learn such a thing as that.

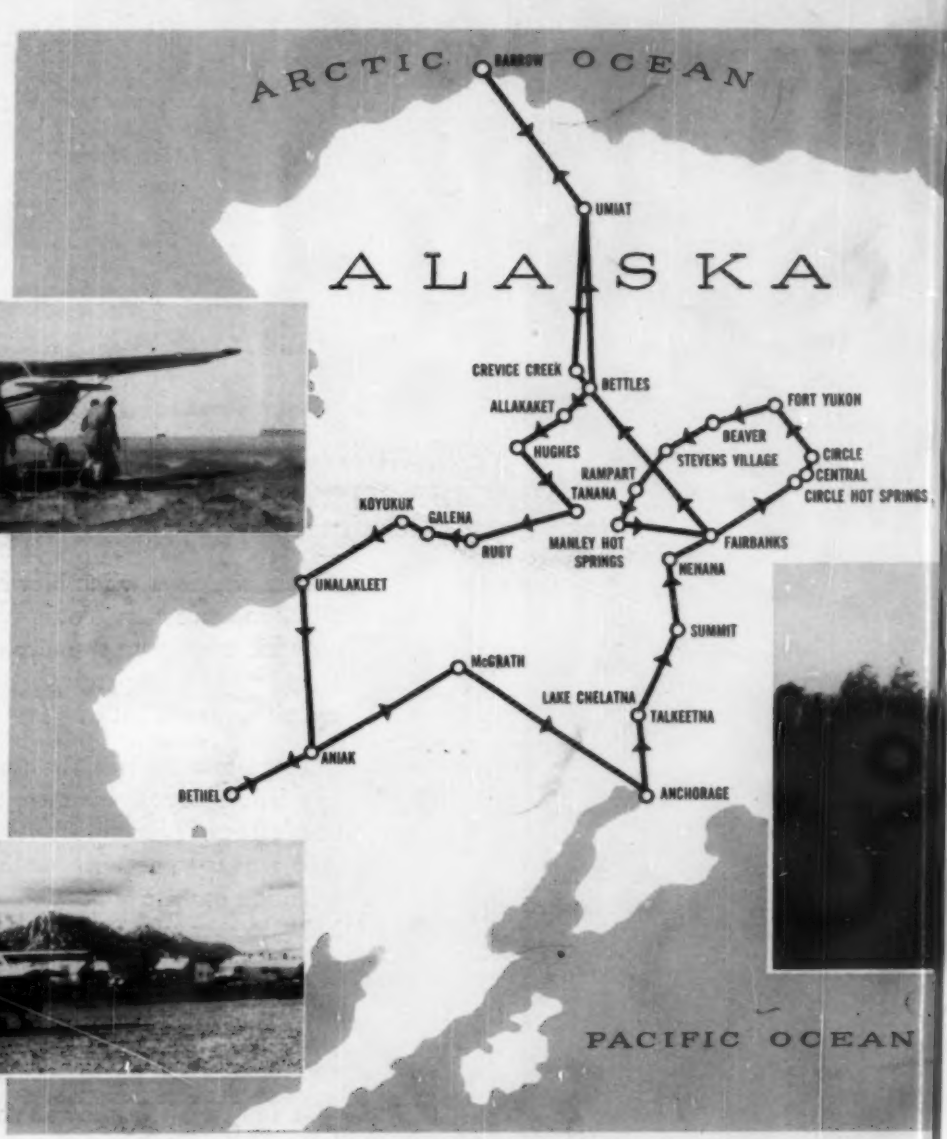
It's always this way in the life of an airman. History is forever reaching up her hands to claim his attention, to challenge his outlook. Of course, he doesn't have to respond to challenge or show an interest in her demands. He can overfly it all and be damned to it. But then he misses the whole point of being a pilot—of being able to circle the things that loom monumental in life until understanding comes with familiarity.

In former times I often would wonder how men could betray such a country as ours, could chance her ruin to further their self-interest, could damn her with their gutless compromises. Then I came to realize they just didn't know their country—just simply didn't know it. It had never been their fortune to move around over it until its length and breadth and depth was a part of themselves—so much a part of them that there could be no peace for them or rest until its destiny was secure.

GILL ROBB WILSON

Loading the 172 on skids at Point Barrow for trip to military field.

Author's plane at the CAA station in Summit. Strip is 5,000 feet long.



TWO YEARS and some 200 flight hours ago, I graduated from a Cessna 140 to a "172" and was bombarded by a barrage of skepticism. Some of my veteran Alaskan friends felt that I had made a bad choice from a utility standpoint. "It's a grand airplane," they agreed, "but it is underpowered for bush flying and the tricycle gear will greatly limit its utility in this country."

However, my logbook now shows 675 landings of the 172 on 54 different Alaskan fields and strips, only nine of which had hard surfaces. I'm anything but an expert bush pilot—no genius at squeezing the ultimate utility from an airplane. But the 172 has served me well. My experience has highlighted a few facts that I judge might be useful to other pilots who like myself fly non-professionally.

A glance at the charts will show a lot of fairly short trips in Alaska. How does this affect the utility of the Cessna 172? The handbook says you can lift a full gross load off a hard-surfaced sea level runway in 725 feet; and clear a 50-foot obstacle in 1,650 feet. I have found these figures to be accurate or slightly pessimistic. For example, I have made numerous landings and take-offs at Lake Chelatna Lodge, a beautiful hunting and fishing spot about 100 miles north of Anchorage. It is accessible only by air, and ideal for floats. Wheels are not so good, but there is a 1,000-foot strip, quite rough, with spotty areas of gravel, clay and sand. In wet weather the clay areas are soft; in dry weather the sandy areas are soft, yet take-off at full gross with no wind is not a problem. I have 200 feet of runway left when I hop off with no flaps. On landing with full flaps I use just over half the runway. This checks the handbook figures of 680 feet ground-roll at sea-level and full gross. Again, the handbook seems a little pessimistic since my ground-roll seldom exceeds 600 feet and the field elevation is 1,500 feet.

This is the shortest length of strip I care to use. Sandbars, beaches, and mud-flats may be available very near to the fishing, but they are for other people. Even if I had a Cessna 180 or a Super Cub, they would be for other people. I don't get paid to fly; I pay to fly. My 172 is not suitable for such operations, and I'm just as happy with it.

Having measured the performance, just how much flying can you do with a 172 in Alaska? Accept, first, the 1,000-foot strip as a minimum. Reject the use of strips at alti-

Though not intended for rugged bush operation, the tricycle geared 172 proved its mettle flying in and out of small unprepared fields in the heart of Alaska

THE "172" IN THE BUSH

By RALPH C. GEORGE

Soup's on. Camping on the edge of a remote Alaskan airstrip. Note Pop-Tent under wing.

tudes above 2,000 feet unless they are longer. Although Alaska is full of small, uncharted strips that might be useful, such as Lake Chelatna, restrict the problem to charted strips. Ignore the Aleutian Chain because of the frequent over-water hops. What's left?

Ignoring major military bases, the charts show a total of 273 usable strips and airfields. All lie at altitudes under 4,000 feet; 99 per cent under 3,000; 93 per cent under 2,000; 76 per cent under 1,000.

How about length? Twenty per cent of the strips are over 4,000 feet long; 48 per cent over 2,000; 85 per cent over 1,400; 97 per cent over 1,000. Should you never use a strip shorter than 1,000 feet you could use 266 of the 273 available. Furthermore, they are well distributed. You can't go everywhere, but you can cover a lot of Alaska. The take-off performance of the 172 is hardly a limitation insofar as charted strips are concerned.

The story is obviously not complete. If you have a 50-foot obstacle at the end of your 1,000-foot strip, you are clearly out of luck. The 172 needs all of 1,650 feet to clear it. With climb-out considered, how many of those 260 strips are still usable by the 172?

The answer is cheerful. Half of the 260 strips already counted are over 2,000 feet long. On these you have it made. An even larger percentage are 1,700 feet—a very popular strip length. A large proportion of Alaska's strips lie along coastlines, lakes and rivers. There's a simple reason: that's where the people live. Under such conditions it isn't surprising that many runway approaches lie over water, obstacle-free. Strips are frequently built on a river bend with both approaches over water. A few of the 260 strips that I have called useful may have approaches that restrict their use by the 172, but I have visited 20 per cent of them, and all that I have used were good.

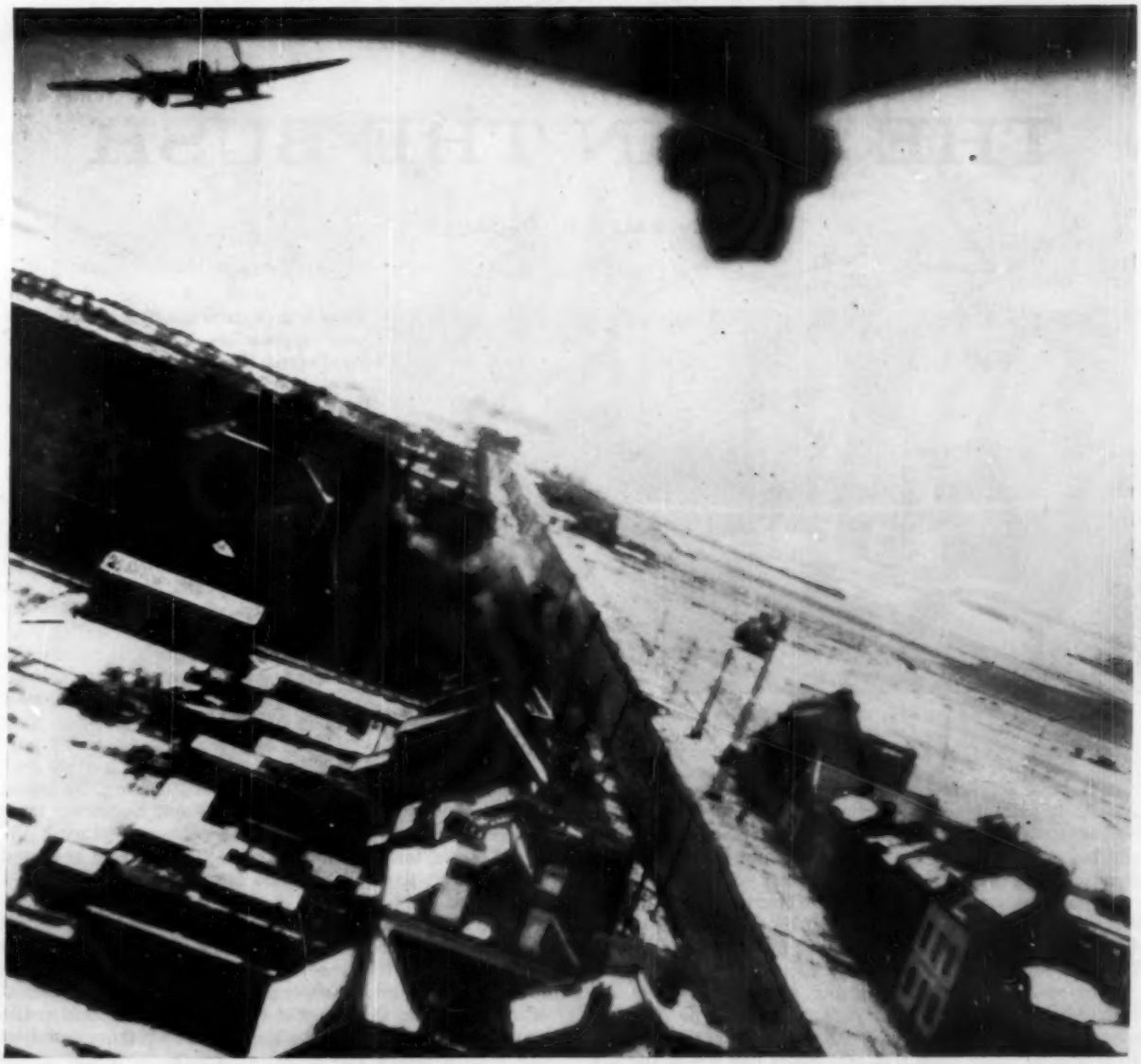
It is comforting to know that most Alaskan charted strips are long enough to be used by the 172, but what happens on the ground? Is the tricycle gear a limiting factor?

If I must have wheels, these are the wheels I want. I would never own conventional gear again. The professionals will never agree with me, but they want an airplane for a different purpose. For my purpose the tricycle gear is it. Easy taxiing. Easy take-off. Easy landing. No sweat in a cross-wind. I learned enough of this balancing trick to keep the old "140" out of the junk-yard during 130 flying hours, but I'm glad it's over. The tricycle gear and the Para-Lift flaps are the two features of the 172 that I most prize.

Have I had any trouble with the nose-gear? No. Doesn't the nose-wheel drop into holes? Yes; it bounces right out again, too, just like the main wheels. Doesn't that little nose-wheel dig into the soft ground? No. that little wheel is little because there's next to no weight on it. My wife can lift, with one hand, the nose-wheel off the ground by the prop spinner. The center of gravity is ahead of the main wheels, all right, but not very far ahead. The nose-wheel comes about as close to floating as is possible.

Very well, so the tricycle gear is good. How does it act on take-off from a soft field? If it's soft enough, you won't take off. Even at full throttle the main wheels won't move. On the other hand, if the main wheels will even start to move, the chances are that you'll be off in one mad rush. The tail will go down, the nose-wheel will lift completely off the ground and you're away. It isn't the nose-wheel that keeps the airplane from taxiing or taking off over very soft ground—it just looks that way. I have never seen the nose-wheel stuck in the mud unless the main wheels stuck first. I am sure there are marginal cases where a conventional-geared aircraft will get off when a tricycle-geared one will not, but they are (*Continued on page* 50)

Smoke rises from a bomb burst during the raid on Amiens prison as Mosquito climbs away and the tail wheel of another is silhouetted at the top.



THIS IS THE STORY of great walls that were breached almost as miraculously as those of the ancient city recorded in the Bible. That this breaching was a miracle of precision and timing, detracts nothing from the comparison. Great imagination was present in both cases.

By February, 1944, the French Resistance movement was in dire straits. The full weight of German intelligence had been thrown against it and collaboration by a minority of unpatriotic or cowardly natives was all too effective. Hundreds of underground leaders were in jail, many awaiting execution of the death sentence, and those as yet unapprehended were harassed to the point of desperation. Some bold stroke was needed to put heart into the patriots—and, if possible, restore some of them to liberty. This was the more important, in that an aggressive Resistance organization was vital to securing of the detailed intelligence necessary to eventual invasion plans.

The possibility of developing some bold, heartening stroke to liberate certain Resistance leaders and simultaneously to boost the morale of all French patriots, seemed to center logically on Amiens, the ancient Roman-built city that lies in the heart of the Somme Valley in northwestern France. Here in a famed prison were incarcerated many freedom fighters, some of whom were scheduled soon to die before firing squads.

The French Resistance leadership smuggled a courier through to the Allies with a plea for cooperation; and

A daring and difficult raid on Amiens prison by the Royal Air Force brought freedom to members of the French Underground.

OPERATION JERICHO

By DAVID WEST

sent detailed information of the Amiens prison routine. As was customary with any plea from the Underground, the proposal was given immediate attention. The Royal Air Force made photo reconnaissance layouts of the area, and studied the situation. Resistance leaders had advised that neither a Commando raid nor a paradrop attack would be feasible. Amiens was too far from the coastline to permit a surprise by a surface raid. Additionally the entire area was heavily defended by anti-aircraft batteries and large bodies of troops were stationed between Amiens and the coast.

But the Resistance did have a suggestion. On a previous occasion, Mosquito fighter-bombers from England had raced across Holland in broad daylight and planted a stick of bombs smack into the single building in The Hague, which housed German Administrative Headquarters for Holland. Could a similar technique be applied in the case of the Amiens prison? Could certain sections of the prison be destroyed so that en masse escape could be made?

The Resistance had a lot of pertinent information that could be used. Their layout of the prison showed where the outer wall should be breached to give egress to the inmates; where the prison guards were quartered; location of the guard messhall; location of anti-aircraft batteries and a wealth of similar detail.

If the RAF could stage its attack exactly at noon, the guards would practically all be at lunch. Additionally the industrial workers in Amiens would all be out on the roads and streets going home to their mid-day meal and the escaping prisoners would be able to mingle with them and so avoid immediate recapture by surrounding troops.

This reasoning made sense to the Allied Intelligence officers. Accurately placed bombs could practically destroy the guard detail at lunch or in barrack rooms. Surprise of other area forces would be possible. True, there was a heavy concentration of Luftwaffe fighter squadrons around Amiens—the Famed "Abbeville Kids," for one outfit—but some surprise might even be worked on them since the attack would be at the lowest possible level—on the deck.

The five-foot model of Amiens prison which was made for briefing RAF air crews. When compared with the photo on opposite page, one can see just how accurate the model was.

Initial planning of the project was placed in the hands of Air Vice Marshal Basil Embry. Embry selected the top expert of the RAF in the techniques of such special precision work—Group Captain Pickard, a 20-year-old flying genius who had already won the DSO three times and had led a special Czech squadron on more than 100 combat missions. Pickard was accustomed to critical assignments. He had made numerous landings behind the enemy lines to pick up intelligence agents. On one occasion he had been shot down in the North Sea and drifted several days on a raft. Such a project as the Amiens underground rescue was right down his alley. Presently, he was commanding No. 140 Mosquito Wing of the RAF's 2nd Tactical Air Force. It was a composite outfit consisting of British, Australian and New Zealand squadrons and Royal Canadian Air Force airmen. Aircraft from this Wing had pulled off that job at The Hague. They specialized in harassment—knocking off power stations—breaking up special occasions—destroying dams and reservoirs—disrupting field headquarters.

To Pickard and his crews then, this Amiens project was routine—except for one fact. Many individuals among the squadrons owed a big debt to (*Continued on page* 64)

Top photo shows wing position with piston retracted, in the lower, the wings are at maximum angle.

WINGS WITH SPRING

This ingenious device makes for smoother ride in turbulent air, increases stability and safety.

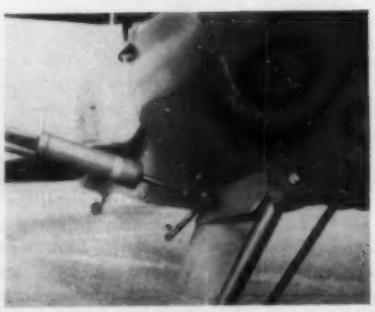
By GLENN INFIELD

THE OTHER day I flew a BC-12D Taylorcraft that was as stable in the air as a C-47 or C-119. Admittedly, being some 14 years old, the BC-12D is far from the newest plane on the market and, even when it was just off the production line, many pilots found it unstable at near stalling speeds. I was prepared for a jolting, wing-down, wing-up ride when I taxied out to the E-W runway at Beaver County Airport, Beaver Falls, Pa. that gusty afternoon. As soon as the wheels left the ground, I was ready to start fighting to keep the wings level but to my surprise we climbed straight ahead with only an occasional dip of the wings.

"Why don't you relax and enjoy the ride?" Earl Metzler, sitting in the other seat said, grinning at the tense grip I had on the control wheel.

At 1,000 feet and out of traffic, I opened the left door and looked down at the reason for our smooth ride—where the wing strut joined the fuselage, this Taylorcraft had an air-oil rubber-cushioned cylinder. As I watched, the strut extended and retracted as we encountered rough air, yet the fuselage maintained an uninterrupted, smooth flight path. The shock was absorbed by the piston in the cylinder instead of being transmitted to the aircraft body.

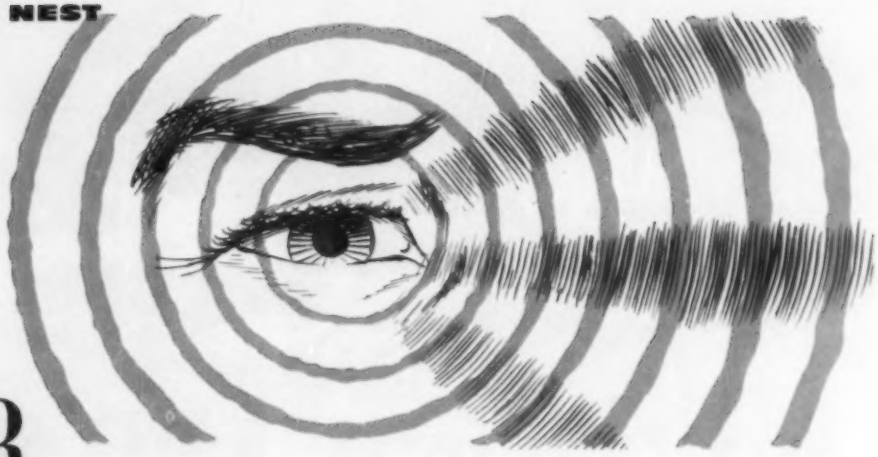
Piston positions, at lower strut end, corresponding to wing angles shown in upper photos.



Metzler originally obtained the idea of "wings with springs" in 1930 while watching crewmen adjust the struts of a mail plane at Bettis Field in Pittsburgh, Pa. He decided there ought to be a way to make such adjustments automatically in flight to counteract the turbulence and variable strut loading encountered. But it took until August, 1957 to develop, install and have the air-oil cylinders certified by the CAA.

Technically the setup is fairly simple. A cylinder 10 inches in length and 2 inches outside diameter is installed on each strut where it joins the fuselage. These cylinders allow the wing to move through a range of 30 inches. Inside, the cylinder is a piston cushioned by oil and rubber. Under the seat in the cockpit are two air accumulators 10 inches by 2 inches with a wall thickness of .049 inches; a bypass joins the two accumulators in case of failure of one unit. The accumulators can be emptied by a valve in the cockpit and refilled with an ordinary automobile tire pump. There is also a gauge in the cockpit which indicates the actual strut loading at all times. Normal ground pressure is 150 pounds on the gauge.

Sitting in its parking space at the airport, the wings of the Taylorcraft looked almost droopy. This, I discovered, is because the wing has no dihedral on the ground. On take-off, though, the wings lift similar to the flexible wings of a B-47 as they encounter increasing air pressure. On a subsequent flight I had Metzler pilot the plane while I watched the cylinders operating. During the ground run, which was very short, the pistons didn't extend but as the aircraft became airborne they started moving in and out, the amount depending upon the turbulence. When I expressed surprise at the short take-off run, Metzler explained that because the wings had no dihedral while on the ground, they catch air faster, shortening the required takeoff distance. (*Continued on page 62*)



FLICKER VERTIGO

Like an enemy in the guise of a friend, it can sneak up on you when least expected.

By SCHOLER BANGS

SUMMER FLYING DAYS are near, with CAVU weather and those lazy, perfect approaches into the setting sun. But watch it! Right then is when you should be doubly alert for one of the weirdest, sneakiest tricks that can be played upon an unwary pilot.

If the end result is a crackup—a minor one, we'll assume—you will probably spend recuperating hours trying to figure out what happened. The doctor has rated you sound as a pre-inflation dollar aside from your assortment of cuts and bruises. But how are you going to explain that, just as you cut your throttle to full-idle and eased into your flareout, you went completely psycho? And your report will read something like this: "Coming out of final approach glide, everything suddenly went red, as if I were in the center of a cloud of red flame. Lost all sense of vision and direction. A feeling of overwhelming panic, and then the crash."

But don't worry. They'll not cart you off to the booby hatch. Nor will you lose your ticket. More than likely you'll find yourself being congratulated by the accident investigator on being alive to tell about your introduction to Flicker Vertigo.

Of course, if you do all of your flying in a twin-engine job, or a jet, all of this will be quite academic. You're immune! But, if you are flying a single-engine plane or a helicopter, you are a potential victim.

Flicker Vertigo is what happens when abrupt shadows are inflected upon your vision with a frequency of ten to 20 per second, matching the brain's "alpha" rhythm. Your reaction to it may range from irritation to nausea; even complete confusion and unconsciousness. And it will be sudden, with no by-your-leave warning of what is coming.

It can be induced by an idling propeller in a let-down directly toward the setting sun . . . by the shadows of a helicopter rotor if the sun is at the proper angle . . . even by the flitting barred shadows of closely-spaced trees interrupting the strong light of early morning or late afternoon sun that is to your right or left as you speed along a highway.

One of the few reported descriptions of flight-encountered Flicker Vertigo was given by the pilot of a Culver Cadet who related being seized by violent nausea, and nearly passing out, while landing into the setting sun. Fortunately, he made a safe landing, but continued to feel impending nausea while taxiing and until he turned from his westerly heading. The idling rpm of his propeller had been between 300 and 600.

Flicker Vertigo has been particularly interesting to Maj. Charles A. Berry, Chief of USAF's Department of Flight Medicine at Randolph Air Force Base, Tex. Reporting to the Aero Medical Association at a national conference held in Los Angeles, April 27, he cited dramatic examples of "grand mal" induced by flicker effects:

A B-36 tail gunner, scanning the engines, last remembered seeing the sun through slowly-turning propeller blades before he was seized by convulsion. In another instance, a pilot was serving as airdrome officer meeting an incoming C-54. While standing on the ramp awaiting engine shut-down, he noted the rays of the setting sun through the revolving propellers, and suddenly collapsed in a grand mal convulsion. In both instances, the seizures were reproduced in the laboratory by photic stimulation at ten, 12, 14 and 16 flickers per second.

Another military instance has been reported by the pilot of a B-26 who said that Flicker Vertigo was induced by the flickering of sunlight through a crack in a vibrating instrument training hood. Vertigo, he said, was instantaneous, with no build-up time. He felt that the plane had plunged into a steep dive and right turn. The instruments didn't look real . . . (*Continued on page* 72)

It's a cinch to fly, says an old time, piston engine pilot after a check ride in a light training jet.

RIDING THE TEMCO PINTO

By NORMAN JACOBSHAGEN

The author, in the cockpit, gets the word what all this "ball o'wax" is about from pilot Martin Collis.

WHAT IS ONE UP AGAINST when he steps cold into a jet after years behind conventional power? What are the reactions, from an instructor's point of view, about starting primary students in jet aircraft? What of student reaction to initial instruction on jets?

When I received an invitation, at the instigation of FLYING, to try out on Temco's Navy Trainer, the TT-I, I felt a sense of excited apprehension. The only thing I knew about jet operation was what I had read. In the past I'd written a number of check pilot articles covering the piston-powered field but had never been in a jet cockpit. "That's exactly why we want you to fly the TT-I," the magazine said. "We want to hear what an old instructor has to say about the whole ball o'wax."

My immediate reaction to the Temco invitation was that any jet is a pretty hot piece of machinery, maybe better left to younger men with faster reflexes and no piston-

Line up of Temco TT-1 Pintos, ready for delivery to U.S. Navy, show off their lean, clean beauty on the ramp.

powered habits to overcome. Martin Collis, Chief of Experimental Flight Test, who flew all the development on the Pinto, must have sensed this—or perhaps he's run into it before. All during dinner the evening before the flight he kept making a point of how easy the TT-I was to fly.

"Just like a Cub," he kept insisting. "If it wasn't for regulations, I wouldn't even bother to go with you."

"Yeah, yeah," I thought, "this sounds like the old sales buildup." Too many times, I've discovered, a pilot experienced on a particular aircraft forgets the difficulties he originally may have had in mastering it. I've learned to be skeptical.

Next morning at Temco's Greenville, Tex., plant, I was struck by the lean, clean beauty of the TT-1. Some aircraft intrigue you on first sight. The Pinto is such a plane. The slender nose, the tail boom resting above the tailpipe, the widespread gear—all blended into an invitation to fly.

"Climb into the front seat," Marty invited me, "and I'll show you all you need to know."

First on the list was the ejection seat. It's remarkably simple. At the top of the overturn structure, which goes up the back of the seat, is a wide handle. You reach over your head with both hands and grasp the handle. Pull it over the top of your head and in front of your face. This single action blows the canopy and, as you get the curtain protection in front of your face, ejects the seat. An aneroid bellows is set to open the chute at 10,000 feet. If you're above that altitude, of course, you'll free fall until passing the 10,000 foot mark. If you're below that altitude at the time of ejection, the chute will open three seconds after being separated from the seat.

One nice touch for pilot comfort is the method by which the rudder pedals are adjusted. Just under the panel is a small crank. By operating this, both pedals move forward or backward until they are exactly right for any individual. This is a trick some of our business aircraft manufacturers might look into.

Starting was also simple. Turn on the battery. Turn on the fuel boost pump and fuel shut-off valve. Hit the toggle starter switch and hold until the engine reaches approximately 20 per cent. The starting motor remains energized and brings the engine up to about 30 per cent. At this point move the throttle to IGN. You can hear the engine torch off and see the tailpipe temperature go up. At this point move the throttle to IDLE. Signal for the battery cart to be unplugged, turn on the generator and inverter, have the chocks pulled and you're ready to roll.

At that point, Marty said, "Go ahead. She's all yours." Application of 100 per cent power brings the little Continental J69-T2 turbo-jet up to a screaming crescendo, starts you moving and you ease back to idling.

First impression as you start taxiing is that you're sitting out in front of the entire airplane. Both seats are in front of the wing leading edge. I had a fleeting thought that this might be troublesome to a new student since there is little in the way of reference points to determine aircraft attitude. However I didn't think further about it, perhaps because I had become accustomed to the same situation in soaring planes.

Visibility on the ground is about as good as one can get. Combined with the stability that comes with the 13-foot tread, it's easy to taxi too fast; 40 per cent to 50 per cent of power gives a good taxi. The nose wheel swivels 40 degrees left or right and is not steerable. All ground turning is done with brakes, which are smooth and firm.

Pulling out on the runway, we set the flaps to 20 degrees which is normal for take-off, made sure trim tabs were in the proper position and applied full throttle. The high scream arose so I was sure the engine was operating. But nothing happened. I wondered if Marty was holding the brakes for some reason or if I had goofed. Then the little ship began to move. I had read about the sluggish response of the jet engine, but apparently wasn't prepared for this experience. Any piston power pilot will be a bit disconcerted the first time he starts a takeoff from a dead stop. Once we got moving, things (*Continued on page* 67)

AIR SPORT

French woman parachutist Monique Lamarr heads for the target during a free fall of several thousand feet.

Parachute Instructor Nate Pond checks a student jumper in exit technique prior to student's first jump.

Object of maneuver is to kick feet out from the special step, leave the plane in a horizontal position.

Lt. General James M. Gavin, World War II commander of the 82nd Airborne Division, was on hand to present the Leo Stevens award to Jacques Istel for his outstanding activity in promoting sport parachuting. Left to right, Col. William Fairborn; USMC; General Gavin; Istel; and Joe Crane, original organizer of the Parachute Club of America of which General Gavin serves as chairman of the board.

Spectators had a field day with jumps by students and experts from early morning to late afternoon. Mothers watched somewhat apprehensively a son's first jump and friends speculated on the possibility of taking the one-day jump course themselves. Coming from all over the east by plane and car, the audience learned about the new sport from public address descriptions as jumpers went through their paces.

Sport parachuting was

the order of the day at Orange, Mass.,

to dedicate America's first

CENTER

Above: Members of West Point team huddle prior to making team jump.

Below: Instructor helps student Frederick Terry of Worcester, Mass.

OPENING DAY of the new Air Sport Center at Orange, Mass., was an introduction for thousands of spectators to the new sport of parachuting. As reported in the June issue of FLYING, the new center will be open to all air sports but its primary activity will be sport parachuting—and the sky was full of jumpers all day.

But the jumps in themselves were not what intrigued visiting airmen most—rather it was the refreshingly enthusiastic spirit of the young men taking part in a challenging and satisfyingly rugged sport. Notable was the calibre of the parachutists, a clean cut, eager group. Equally notable were the many parents, wives and friends on hand to witness the first jump of a son, husband or friend and to cheer on the efforts of teams from such institutions as Yale, Cornell and West Point.

Not all of the jumpers were youngsters, however. In the class of students taking the "one day, first jump course" was 54-year-old Crocker Snow, Director of the Massachusetts Aeronautics Commission which has been an effective supporter of the sport parachuting movement. END

Below: Five members of U. S. Sport Parachuting Team: Joe Flynn, Nate Pond, Dana Smith, Lew Sanborn, and standing below, Jacques Istel.

Below: Maj. General Charles G. Callaway, commanding general of the Army's QM Research and Engineering, Natick, Mass., and his staff were interested spectators. Below right: Former World Champion and head of French team in 1958, Mrs. Monique Laroche Lamarr prepares for precision jump. The 95-pound parachutist has more than 500 jumps to her credit. She is married to a French surgeon and has two young sons.

If you want something easy, comfortable and fun to fly—economical as your car to operate—here is the plane for you.

CROSS-COUNTRY PILOT REPORT ON

By ALICE S. FUCHS

WHAT MAKES A GOOD AIRPLANE? Depends on what you want it for—student instruction, bomber, cargo plane, business aircraft—each has its own requirements. When I took a look at the 90-hp, Continental-powered Fornaire recently, I was interested in one thing—a good cross-country airplane in a reasonable price range for the average pilot. You can't judge the cross-country qualities of an airplane by a few hops around one airport; so I took a trip to check it out. How fast, how comfortable, how expensive, how practical is the Fornaire for the ordinary businessman?

Descendant of the Ercoupe and the Forney Aircoupe, the Fornaire was chosen for this project because, of all planes on the market, it is the one which a busy person who hasn't much time to spend keeping up proficiency can learn to fly safely in the shortest length of time.

Two years ago I had given the Forney Aircoupe a thorough check-out at the factory, but this was different. I was now interested in checking the airplane in a cross-country situation, and there had been numerous changes in the aircraft in the past two years.

It was a sunny morning when I flew from Denver to Fort Collins, Colo., site of the Forney factory. The snow-frosted Rockies towered just west of the airport and visible 30 miles away was "Fort Collins Omni," and the trailing ribbon of smoke from the cement plant that serves as an ever-present guide to pilots.

Airplanes in various stages of near completion were in the Forney hangar. The plane I was to fly was cream and Cadillac green with orange Day-Glo (now standard on all Fornaires) on the spinner, outside of rudders and underside of wing tips. The plane was a new one going to Al Lewis in Cincinnati where for the next six months it was to appear on Uncle Al's Hour, a children's TV program over a national hook-up.

Above: The author prepares for take-off at Fort Collins (Col.) Fornaire factory. Bubble windshield is tinted for sun protection. Left: Improved nose wheel fork gives added strength.

At the end of the hangar storage space the remains of one of the few cracked-up Forney Aircoupes showed the rugged construction which makes for cockpit safety. A pilot had taken off from a private turf strip with a home-made tow bar, constructed from an 8-foot pipe, still attached to the nose gear. Just after he was airborne, the pipe had snagged on the ground with such force that it knocked the engine clear off its mount. Did the airplane no good at all, but the cockpit was intact. The pilot cut himself getting out and had only a Band-Aid to show for his big adventure. This speaks well for Forney construction. The accident incidentally would not have happened if the pilot had been using a regulation Fornaire tow bar.

I talked with Neal Church, who heads the Aviation Division of Forney Industries. Neal would be a big man in any company. Standing six foot three and weighing

245 pounds, he was an ideal person to check the Fornaire roominess. Did he fit in the Fornaire, I questioned, and would he mind demonstrating? He did fit and he wouldn't mind. Obligingly Neal got into the pilot's seat. Room to spare even if you're six foot three.

One of the past year's improvements in the Fornaire was the Belleville shock absorber system in the main landing gear. A demonstrator, fitted with a small door in the gear, gave a view of the new shock absorbers. They give a smooth ride on rough fields, I was told, give better taxiing control, reduce "pitch," making less wear on nose gear parts, reduce landing shock and eliminate the tail "droop" that developed in older model Ercoupes. As I have always been impressed with the shock absorber system of the Aircoupe and the "feather bed" landings it made possible, I was interested to see what this further refinement would do to what was already considered an excellent gear.

Another change is the newly designed nosewheel fork, which offers additional strength. Can't get a shimmy out of it if you try.

The flight was not to be a maximum performance flight, checking for the ultimate performance that could be squeezed from the plane by an experienced test pilot flying solo under ideal conditions. It was a check on how the airplane would perform under average conditions with the average care that a cross-country pilot intent only on "getting there" would give to his journey—how it would perform under varying weather, terrain and field conditions, making frequent stops and possibly flying against headwinds.

Since it is common practice to "load it up" on a cross-country trip, I wished to fly at gross weight. The baggage and I weighed 174 pounds. As "companion" on the trip I carried enough Ft. Collins airport gravel to bring the plane up to 1,400 pounds gross weight.

The trip was planned as a businessman's flight from Ft. Collins to Cincinnati, with stops at Goodland, Salina, Columbia and Terre Haute. As it developed, a fifth unscheduled stop was made.

Aside from the usual engine instruments, the plane was equipped with sensitive altimeter, airspeed indicator, venturi-operated turn and bank, vertical speed indicator, clock and outside temperature gauge. Radio equipment consisted of a Narco Simplexer, Model VC27, with Omniplexer VOA-2.

Take-off was made at noon, with another Fornaire flying escort for a few minutes out. Maintaining my original 95-degree heading till I reached Greeley, Colo., I did a rapid off-course correction on my Jeppesen Computer and altered the heading five degrees to the right.

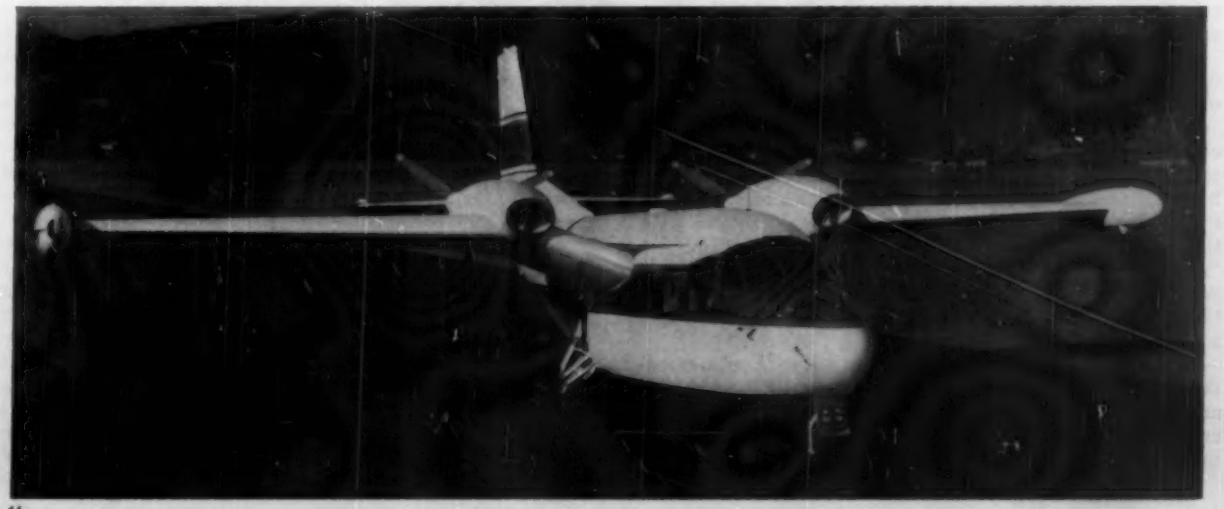
Viewing the aircraft objectively, I settled back in the seat and tried to forget I had ever flown a Fornaire or either of its Aircoupe-Ercoupe ancestors. Was this really a cross-country airplane? The mere fact that I could settle back in the seat was significant—it was comfortable, foam-rubber that gave one the feeling he could sit in it for hours. The foot and leg freedom afforded by the lack of rudder pedals is a special asset for long cross-country flights. There were other cross-country conveniences: baggage was readily accessible; two large pockets provided convenient storage for sunglasses, computer and maps; a shelf behind the seat held other essential items and was especially handy for storing camera and exposure meter far enough away from the instrument panel to keep from affecting the compass. The tinted bubble-type windshield offered sun protection, while an overhead sunshade panel could be adjusted to suit the time of day and slant of sun expected en route.

Flying against a strong headwind, I kept relatively low to avoid stronger winds aloft, and the air was rough. I found myself fighting the turbulence. Remembering the reputation of the old Ercoupe for giving the pilot a beating in rough air, I pondered the mat- (*Continued on page 52*)

LIGHT 'COPTER Left: Hughes Model 269A two-place light helicopter has been recently granted Airworthiness Certificate by the FAA. Originally designed for the Army, who ordered five, the civilian version weighs 915 pounds empty, has a useful load of 635 pounds. It is powered by a 180-hp Lycoming engine, has a top speed of 85 mph and a range of 190 miles. Hughes company foresees many uses for this 'copter, including employment in petroleum, mining, agricultural, fishing industries and other fields.

SIKORSKY S-61 Right: Full size static display of Sikorsky passenger amphibian helicopter powered by three turbine engines. Capable of seating 25, the Sky Liner will have a maximum speed of 150 mph and great operational flexibility because of its amphibious characteristics. The three General Electric turbines develop 1,050 shp each, drive a five-bladed main rotor and a five-bladed tail rotor. Hull is 56 feet long. First flight scheduled in 1960.

TRECKER 166 Land version of the Trecker Gull amphibian is now in production at Trecker Aircraft Corp. plant in Milwaukee, Wis. Airframe is manufactured by Piaggio & Co. in Italy and shipped to Milwaukee where Trecker installs the engines, propellers, instruments and other components. The six-place executive aircraft is powered by two supercharged Lycoming engines rated at 320-340 hp each. Cruising speed is 208 mph and a range of 1,155 miles with 30 minutes fuel reserve. Location of engines makes cabin exceptionally quiet.

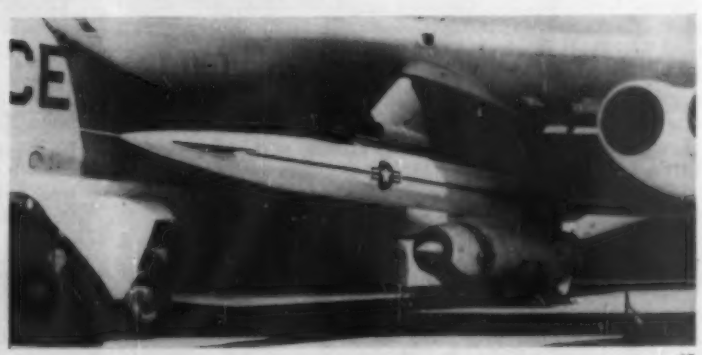


KELLETT CROPMASTER First successful rotary wing aircraft, the autogyro, popular in pre-War II days until deposed by helicopter, is back again on the scene. It will be manufactured by Kellett Aircraft Corp., Willow Grove, Pa., one of the largest autogyro manufacturers in the 1930s. The KD-1A, shown here, built in 1935, will be produced in limited numbers for crop dusting, pipeline inspections, forest patrol and other duties where slow flying is required. Though unable to hover, the autogyro can take off in some 100 feet and land vertically. It is capable of a minimum speed of 22 mph. The main advantage of the aircraft is its simplicity as the rotor is free wheeling, not driven by engine, does not have the complex rotor system of a helicopter and is easily maintained. Price is considerably below that of a two-place helicopter and flying technique much simpler. Photo at right shows blade folding feature to facilitate storage. Twenty-six KD-1As are already on order and Kellett expects to produce 150 by June 1960.

HAVE YOU SEEN?

GRUMMAN MOHAWK Left: One of the largest aircraft to enter Army service, the twin-turboprop YAO-1 Mohawk is especially designed for operation from small unimproved fields. Endowed with STOL characteristics, it has about the same take-off and landing performance as the small single-engine liaison planes. The Mohawk is powered by two Lycoming turboprop engines of 1,005 eshp each, carries a crew of two and has a stalling speed of 59 knots. Wing span is 42 feet. Spots on fuselage and nacelles in photo are wool tufts used to check airflow pattern during tests.

HOUND DOG Right: An air-launched, guided missile developed by North American Aviation Inc. to supplement and extend the destructive capabilities of SAC bombers. Hound Dog will be carried between engine pods of Boeing B-52G. Powered by one Pratt & Whitney turbojet engine, it is equipped with the non-jammable inertia guidance system and armed with nuclear warhead. All specifications of the missile are still classified. Range is several hundred miles, weight over 10,000 lbs. Production version will have afterburner.



NO. 233

I learned about flying from that!

Here is the story of a pilot, a flight instructor to boot, who just kept asking for trouble—and got it!

By MANUEL J. DONNELLY

THE TUNE, "Oh, What a Beautiful Morning," kept running through my mind as I stepped from the Weather Bureau into the clear, crisp air of a New England autumn at the Municipal Airport, Bridgeport, Conn. The weather man had just confirmed the obvious: "A perfect day for a cross-country to Syracuse. Winds will be light and variable, CAVU all the way." I had been in Bridgeport about two months working as a Flight Instructor to build up time and experience to qualify for a job with the airlines.

Walking across the ramp toward the airplane, I saw my student completing the pre-flight on a brand new Cessna 120 with less than 100 hours, total time. Prior to getting aboard, I checked the student's maps, headings, etc., while he was filing our VFR flight plan. Something the weather man had told me concerning the forecast for the next day kept prickling my mind but I couldn't recall it. Presently my student returned, and, with a pull on the starter, the engine jumped to life. A green light from the tower cleared us to the end of the runway and, after going through the cockpit check, we were cleared for take-off. The Cessna responded immediately to full throttle and we left the runway, climbing to traffic pattern altitude.

After the student had oriented himself on course, I leaned back to enjoy the scenery. Although it was rather late in the season, there was still quite a bit of color in the woods below. Presently the Hudson River slid beneath us and we angled north, picking up the picturesque Mohawk Valley. Just three hours after leaving Bridgeport, our wheels touched down at the old Amboy Airport in Syracuse, N. Y. As we tied the airplane down for the night, the forecast the weather man in Bridgeport had given me concerning tomorrow slipped farther back in my mind. Perhaps, if I had noticed that high layer of stratus clouds moving in from the west, I would have remembered.

The following morning the rain beating against my bedroom window awakened me. Then I remembered what that weather man in Bridgeport had said. A low pressure system was moving in from the west and, in order to return VFR, a daybreak start would have to be made. My watch showed the time to be 9:00 a.m., and a call to the Weather Bureau erased any doubts concerning the accuracy of the forecast.

At the airport the map showed an area of bad weather extending all the way from Cleveland to New England. The sequence reports showed the ceilings varying between 600 and 1,200 feet and the visibility from three miles down to one-half mile in the heavy showers. East of Albany the weather was better, but was steadily deteriorating. Bare VFR minimums at Syracuse prompted us to gas the airplane and take off. The sky was a dirty gray, with patches of scud moving along beneath the overcast. I decided not to file a flight plan, figuring that we might have to duck in and out of some of the smaller airports along the way. I didn't want to be bothered closing out and refiling a new flight plan each time. The Weather Bureau had advised that it would be touch-and-go all the way and suggested that we postpone the trip until the following day, but I was a big deal. After all, didn't I have almost 500 hours total time; and have a flight instructor's rating to boot?

We climbed out, headed east and leveled off at 1,000 feet, just below the base of the overcast. I planned to pick up the main New York Central Rail line and fly it all the way to Albany but, before we were five miles from the airport, broken layers of scud moved in underneath us and heavy rain cut our forward visibility to zero. I was cocky but not a complete fool, so I started a 180-degree turn, easing off on the throttle until we broke out about 700 feet above the ground. We headed back to the airport, tied the plane down and splashed across the ramp to the coffee shop. It was 11:30 a.m.

Five minutes after we landed, the beacon came on and the field was closed to all VFR flying. We spent the next two hours between the Weather Bureau and the coffee shop. At 13.30, they were again giving 1,000 and three, so we took off and headed east right down the "iron beam," again without a flight plan for the same reason. The best altitude seemed to be about 800 feet, and there was just an occasional patch of scud beneath us. The rain, however, varied between moderate and heavy; and it was necessary to keep the railroad tracks beneath us all the while. Just west of Canastota we were surprised by a Taylorcraft on the other side of the tracks heading west. "Oh-ho, another airborne railroad engineer."

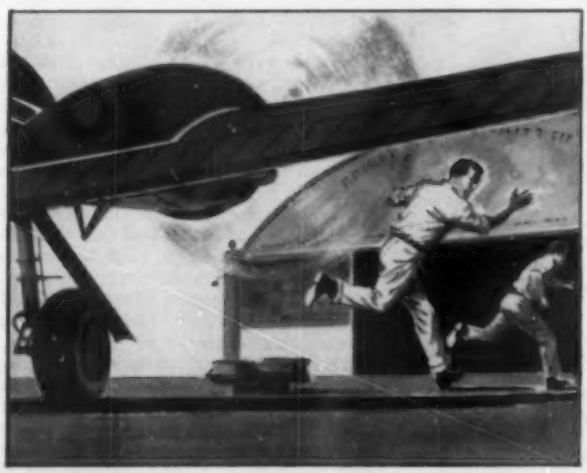
We always used to kid about the pilot who got lost one day following a railroad track because someone on the ground had left the switch open and he turned down the wrong track. Well, about five miles east of Canastota the main New York Central line splits. One branch bears off to the northeast and the city of Rome, while the other branch continues directly eastward to Utica. The compass was bouncing around like a ping-pong ball on a marble floor, and any attempt to average out its swing meant picking a heading somewhere within an 180-degree arc. So I sat back fat, dumb, and happy and followed the open switch up to Rome. It wasn't until we were practically right over the Rome AFB that our error became apparent. Hightailing out of Rome, we (*Continued on page* 70)

ESSO

WING TIPS

DON'T CHANCE IT. Many a hot-shot pilot *thought* he could make it! You may think you know the area like the back of your hand, but don't chance it during hazardous weather. Minimum conditions for visual or instrument approaches and flight paths were set up for your safety – follow them!

AVOID "HEADACHES". Rough weather, grabbing brakes or any crash situation will cause injury of some sort if you're not strapped in securely. Check your seat belt and shoulder harness periodically for wear and anchorage security. Wear them and avoid "headaches"!



STAY "ON THE STICK". Failure to make corrections while taxiing has been the cause of countless groundloops and nose-up accidents. Be alert all the time – wind gusts, last-minute turns, overcorrections and near misses if not handled immediately can be costly. Remember, you're still flying 'til it's parked.

REMEMBER: For "Happy Flying"... look for the famous Esso Sign from Maine to Louisiana.

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Highways or Skyways..."ESSO RESEARCH works wonders with oil"

The "172" in the Bush

(Continued from page 35)

really marginal.

How does the tricycle gear act while landing on a very soft strip? The question once bothered me. Experienced friends advised that the nose-wheel would dig in or the strut would break off and over I'd go. This sort of talk is enough to keep a man awake nights. How does the 172 actually act when landing on a very soft strip? Like a dream. The softer the ground, the faster you stop. If it's very, very soft, you stop very, very fast. You don't go over—you just stop. It's possible, I suppose, to nose over, but I didn't, and I stopped once in 100 feet. It was a most interesting and illuminating experience.

It happened at Barrow Municipal, an uncharted strip. I had clearance to the Point Barrow military strip but elected to land in the village for convenience, although advised by radio that the strip was soft and should be used with caution. Naturally, I figured that I was sufficiently cautious. There was low-lying scud and I was eager to get down before conditions deteriorated. In one pass over the field I observed that it was long, straight, smooth, and well marked. Several light aircraft on wheels were parked off the runway. On my second go-round, I went about a mile down the coast where the skies were clear and sunny. Here I dropped to within 50 feet of the beach and executed a long, low, slow approach at half-flaps. Gently we touched down. Suddenly we were stopped. There wasn't time for a single thought. The tail came up just a little. I knew there was no use in trying to taxi; I cut the switch. My wife and I stepped out into loose sand over our ankles.

We had stopped in 100 feet. Our track in the sand was perfectly straight. It was a beautiful, smooth, three-legged slide. All three wheels were dug in. Four grown men couldn't budge the airplane, even with full assistance from the engine. A truck with giant balloon tires finally pulled us off the field. It was difficult enough for us to walk off. The aircraft parked near the runway were equipped with oversize tires and wheels. With these I also could have operated from that strip. I had the airplane loaded on a skid and dragged four miles across the beach to the military field. This makes for an expensive take-off, but I counted it cheap. I had learned something that was worth the price.

Learned what? That the tricycle gear got me in on a strip so soft that I couldn't taxi or even push the airplane. The airplane landed straight and true under such conditions. The tricycle gear kept me right side up under conditions that would have caused any conventional aircraft to nose over. I suspect it would be difficult, provided the touchdown were anywhere near normal, to flip the 172 regardless of how soft the ground. You might get the prop or damage the nose-gear, but I doubt that one would flip except on rare occasion.

Until you fly tricycle gear you don't have brakes—you just think you have. You can wear out tires in a few landings unless careful. My first set of tires went fast before I learned hard braking is for unusual situations or emergencies.

But, if brakes on the ground are important, brakes in the air are even more so. Alaska is full of salty pilots who could fly a barn door into a chicken-yard. But novices like myself need a piece of machinery that is more forgiving. How is it, then, that I have the guts to wander into short, strange fields?

Answer: Para-Lift flaps. Add these to an airplane and a novice becomes a short-field operator. The machine adjusts for lack of airmanship.

Now that we have 260 strips in our book, a final question arises. Are they in good condition? Who knows? Most of them are off airways, and the CAA has little information, except for sporadic pilots' reports, the present Flight Information Manual for Alaska is almost two years old; the condition of grass and gravel strips may change rapidly, and in most cases the only solution is a look. You may meet a bush-pilot who can tell you what gives for most of Alaska's strips are used commercially by one operator or another. There is no information, however, that's half as good as what you get by looking.

NEXT MONTH IN FLYING

SOLO ACROSS THE ARCTIC

Hitherto unpublished story!

Capt. Charles Blair's dash in a fighter plane across the top of the world.

No matter what you've read or heard, you examine the strip—drag it. This is an art in itself. It's surprising how easy it is to miss something. You won't miss the logs, barrels, or ditches. You may miss noticing the depth of the tire-tracks, the soft spots, or the undulating frost-heaves. The best practice is to land in the wheel-tracks, or where the wheels have worn away the grass. The boys who know have been landing there. Be especially cautious in dealing with a grass strip that shows no signs of use. Maybe it just doesn't get any traffic. Then again, there may be something wrong. Most of Alaska's strips get enough use to show the wear.

Some of my veteran acquaintances are advocates of a procedure known as "taking a feel of it." This involves actually touching down and rolling at flying speed in an effort to "feel out" the firmness and smoothness of the runway. I am sure that a really good pilot can do it, but I don't trust my own reflexes. Anyway, the technique is used mostly on sand-bars. I doubt that it is something I need to learn.

I can sum up my opinions on the 172 in Alaska in this way: It is certainly not a bushplane in the same sense as the Super Cub and the Cessna 180. It is not suitable for operation from beaches, sandbars, and other unprepared areas. It is licensed for skis but not for floats. It will take you to the vast majority of charted air-strips. You can see most of Alaska in a 172. The tricycle gear will not limit your operation. It will behave as well or better than conventional gear.

Those who have not flown in Alaska may wonder why a man should fly to tiny villages with improbable names like Koyukuk, Alakeket, and Talkeetna. If you don't like people, you will find the villages unimpressive. If you like people you will find some of the finest individuals in creation. Strangers are welcomed. Conversation is a high art. You can talk to trappers, prospectors, miners, fishermen, explorers, medics, missionaries. Any of these may be white or native. I fondly believe that there are more jewels of humanity hidden in the remote areas of Alaska than you'd find anywhere else. If the warmth of human contact is counted as treasure, the back-country of Alaska is a treasure-house.

During a recent vacation, Betty and I decided to see as much of Alaska as we could in several weeks at a leisurely pace —no fixed itinerary. Since radio nav aids north of the Brooks Range consist entirely of homers, I had an ADF installed and put in a crystal-controlled HF transceiver to insure communications from the ground and over long distances—this in addition to my regular VHF transceiver. It worked to perfection.

The weather couldn't have been much better. We spent two pleasant days at Umist waiting for weather at Point Barrow. I did a 180 out from under some low stuff while trying to follow the Colville River to the Beaufort Sea. Here the ADF paid its way. I simply homed on Barrow. I did another 180 in a pass while trying to get from Bethel to King Salmon, and we spent two enjoyable days in Bethel waiting for weather, in vain. Southwestern Alaska was socked in and our vacation almost gone. Under a 1,000-foot ceiling from Bethel, following every twist and turn of the Kuskoquim River to McGrath and via Ptarmigan Pass we finally reached Anchorage.

We had visited 25 villages in 40 flying hours. Our equipment included tent, double sleeping bag and air mattress, Primus stove, cooking gear, gun, auger-type tie-down stakes, funnel, chamois, food, and clothing. The "Pop-Tent" is ideal for an airplane, since it weighs just over 12 pounds and packs into a bag about 18 inches long by six inches in diameter. The emergency gear, which is always in the airplane, included a two-week supply of dehydrated rations, first-aid kit, flares, flashlight, mosquito repellent and headnets, full fishing tackle, knife, hatchet, matches, candles and compass. We were very comfortable. It couldn't have been a better vacation. Our 172 has taken us into and out of 54 of Alaska's woodsy, grass and gravel strips. It will take us to a lot more. To us, it is a bush-plane. END

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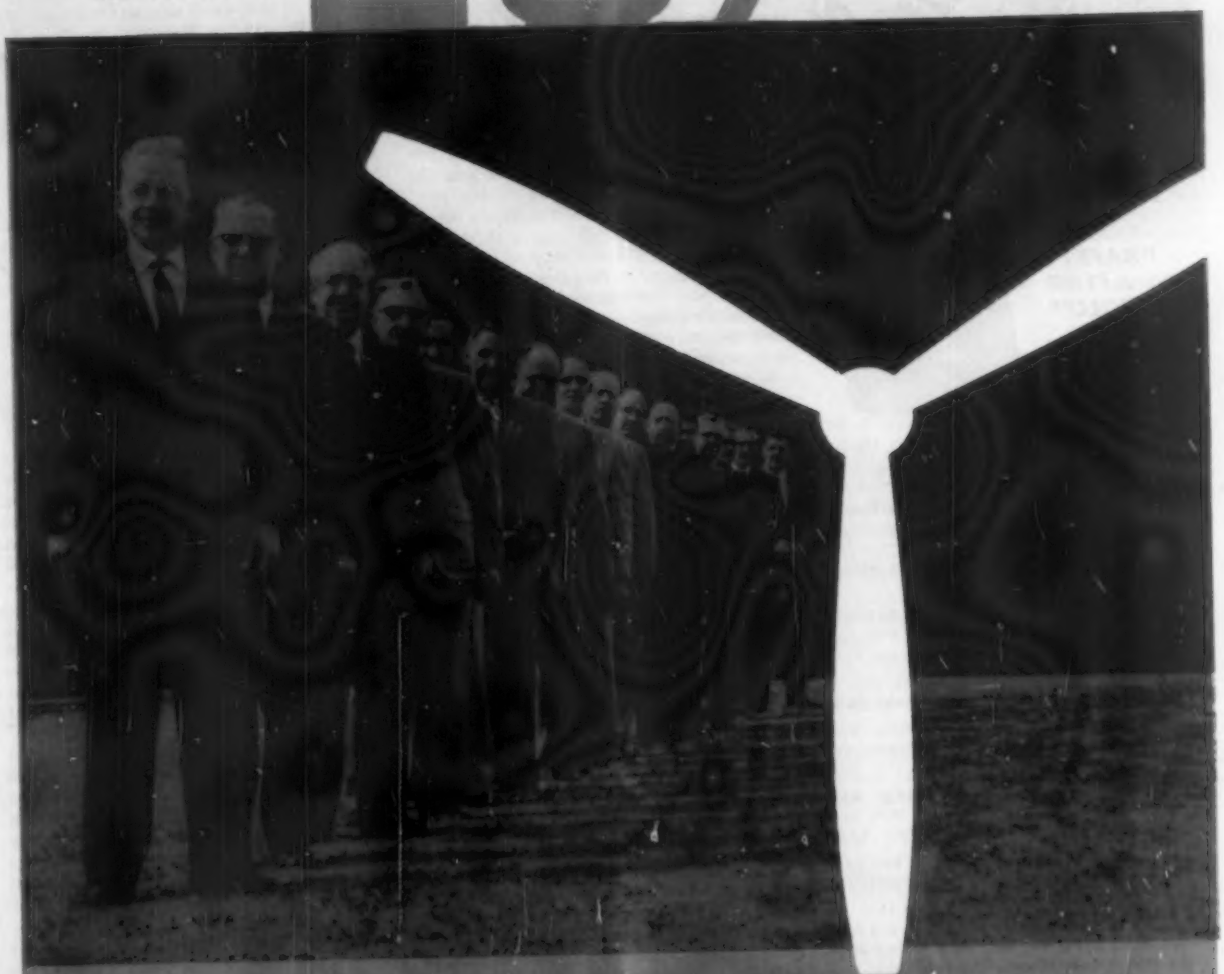

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City & State_____

Check Piloting the Fornaire

(Continued from page 45)

ter. Is a two-controlled airplane rougher in rough air than a three-controlled? Suddenly I realized that my muscles were unconsciously reacting to the turbulence as they would in a three-controlled plane. It occurred to me that if you try to fly a two-controlled aircraft with the instincts fostered by years of three-controlled flying, you will have a very rough ride indeed. However, if you relax your muscles and fly it with the wheel, you may be tossed a bit as in a boat on choppy water, but the tossing will not be unpleasant. It's like getting your sea legs. Once you get the feel of rough air flying in the two-controlled Fornaire, it can be more relaxing than rough air flying in a three-controlled aircraft. I had plenty of chance to prove the theory during the cross-country check flight, for there were headwinds with some turbulence for almost a thousand miles. (Who says the wind blows from west to east! Not when I'm flying!)

Near Akron, Colo. I decided to get a true airspeed figure. Flying at 6,500 feet indicated, I turned the altimeter to a 29.92 setting and got a pressure altitude of 6,300 feet. Outside air temperature was 16°C, indicated airspeed 106, and the computer gave a true airspeed of 119 mph.

Two hours and two minutes after take-off, Four Seven Charlie landed at Goodland, Kan. with a 20-knot wind blowing from the southeast. The Fornaire took 12 gallons of gas at a cost of $4.58. A rapid calculation yielded a gas consumption figure of 5.9 gallons per hour. Even with the handicap of considerable headwind, gas had cost 24¢ per mile, which compares favorably with the cost of driving a car at a much slower speed. A tax refund, available in many states, would further reduce the airplane cost.

The Fornaire fairly leaped off the runway at Goodland, 3,653 feet above sea level (load of gravel and all) and we were on our way to Salina. Cruising at 5,300 feet indicated, with 109 mph indicated, I again worked out true airspeed. A pressure altitude of 5,000 feet and air temp of 15°C gave a TAS of 121 mph. There seemed to be even less noise than in previous Aircoupes I had flown. Had the sound-proofing been improved? (Subsequent inquiry revealed that it had.) At Salina the wind was still strong from the southeast and the headwind had cut groundspeed for this leg to 109. Gas consumption was 5.5 gallons per hour, slightly less than the 5.6 gallons per hour figure given me at the factory. Gas was cheaper at Salina (11.4 gallons for $3.86) and my airspeed slightly higher than on the previous leg, making a cost of 1.7¢ per mile for gas.

At Salina as a Goodland, the Fornaire attracted considerable attention from other pilots. Inevitably the conversation turned to the subject of a two-control system.

"Knew a fellow once who installed rudder pedals on his Ercoupe," remarked one pilot. "Afterwards he said he had just wasted his money. Said he spent $200 extra for automatic transmission every time he bought a car and then when he had an airplane that was simple to operate, he spent money to make it more complicated."

Leaving Four Seven Charlie tied securely against the wind, I departed for a motel in Salina. The next morning I was out for a pre-dawn take-off. The taxi lighting was good. The illuminated compass was a help with the instrument lights, but it would be wise in this as in any aircraft to carry a small emergency flashlight for night flying. Sunrise was spectacular and soon there was no need for lights.

Heading for Columbia, Mo., I decided to fly this leg at 5,500 feet without leaning the mixture to see how much a careless pilot would increase his gas consumption by forgetting to lean. The figure jumped to 6.3 gallons per hour in contrast to the 5.5 figure from Goodland to Salina. Just short of Columbia the gas gage hovered near the empty mark. This gives the pilot a thoughtful moment until he remembers that a 6 gallon header tank gives an extra hour of fuel after the gauge says empty. This reserve fuel arrangement is an excellent safety feature for cross-country flying—should the fuel pump fail during flight you'd have an hour of fuel coming by gravity feed before the engine stopped.

At Columbia I decided to dump my load of gravel and check performance with a light load. Ever try to get a box of gravel out of an airplane where it has to be lifted up and over the side? It's no easy task, but the kindly efforts of Mr. Enlow, local flight instructor, managed the trick in short order.

Lightly loaded, with a ground temp of 52 degrees and a 15-knot wind down the runway, I took off on runway 35 and was airborne before reaching the intersection of 10-28, a take-off distance of 400 feet I estimated.

The air was turbulent and as usual there was a headwind as I tuned in the ghostly voice of "St. Louis Omni." The wind had increased by the time I tuned in on the even more eery sound of "Troy Unattended Omni." Somehow one almost expects the announcement to be followed by the sound of a creaking door.

The sky was now overcast, the air moist. Would the Fornaire engine ice? It would, but carb heat quickly brought rpm up to normal. I was curious to see how much the application of carburetor heat would increase gas consumption if the same power setting was maintained. Refueling at Terre Haute, the next stop, took 17.3 gallons, giving a gas consumption of 6.2 gallons per hour. The application of carb heat has approximately the same effect as flying at 5,500 feet without leaning the mixture.

A check on weather at Terre Haute gave a Cincinnati report of 1,700 feet broken, 4,000 feet overcast, 12 miles, possibility of light rain showers, forecast of lifting and clearing.

Out of Terre Haute I swung east to fly south of Indianapolis and miss the R-65 restricted area. In a short while a light drizzle started. I pulled on carb heat. The weather got damper and lower—an excellent chance to test the plane's waterproof qualities. Nary a drop got inside, though the drizzle became a downpour as I came in for an unscheduled landing at

(Continued on page 54)

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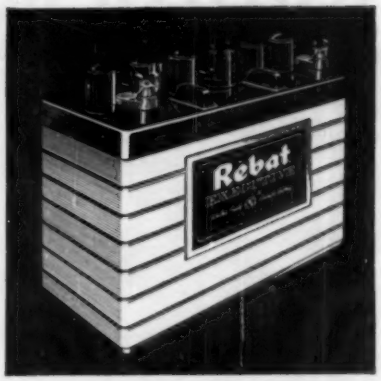

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(Continued from page 52)

Wheatcraft Airport south of Indianapolis, a lively little field with a small-size strip and large-size hospitality. I was followed shortly by various transient and local pilots drifting in through the soggy murk.

A large mud puddle at Wheatcraft inspired a very short field take-off when weather cleared. As I lined up with the runway, the puddle, approximately 200 feet in front of me, threatened a record-breaking mess if the plane failed to get off before than spot. Brakes on, full throttle, wheel back—the plane jumped from the ground ahead of the puddle. I estimated take-off distance of under 200 feet. I didn't bother going back to measure!

A tail wind at last, my first for the trip, brought the ground speed up to 140 mph and I zipped along to Cincinnati to be greeted by Al Lewis, on whose TV program the Fornaire was destined to delight the youngsters listening to Uncle Al's Hour.

When all the facts and figures were assembled I was able to answer the most vital questions about the cross-country characteristics of the Fornaire.

• *Comfort:* Decidedly on the plus side. Lack of rudder pedals a great asset. Seat comfortable, everything within easy reach.

• *Range:* 500 miles. Approximately 4:15 at efficient cruise. This is adequate for cross-country flight.

• *Safety:* A non-spinning aircraft, the Fornaire incorporates features which make it probably the safest airplane on the market. It can be done, but you'd have to pull a real boner to hurt yourself in a Fornaire.

• *Ease of Flying:* A student can solo sooner in the Fornaire than in any other airplane. It is adapted to the needs of the pilot who cannot afford to spend the time necessary to keep proficient in a more difficult airplane.

• *Load Capacity:* Airplane carries two passengers with comfort; 75 lbs. of baggage permitted with pilot and no passenger. With pilot, passenger and maximum fuel, no baggage permitted. With pilot, passenger and minimum fuel (7.5 gal.) 72 lbs. baggage permitted. While it is inadvisable to load any aircraft beyond its certificated limits, the gross weight performance at altitude made me feel that the CAA had been ultra-conservative in holding down the baggage limitation on the Fornaire. I am convinced that it will carry a higher load with safety. An important consideration from the load standpoint is the availability of a kiddie seat for the baggage compartment. This will accommodate a child up to 75 lbs. and is a comfortable seat equipped with seat belt. The child has good outside visibility but has no access to a door that can be opened accidentally.

• *Cost:* Here's how a trip from Denver (the nearest large transportation termi-

(Continued on page 56)

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(Continued from page 54)

nal) to Cincinnati would stack up by other means of transportation:

Transportation	*Cost*	*Time*
Bus	$33.55	38½ hours
Airlines	$84.81 (1st Class)	7 hours
Train	$41.96	26 hours
Car	$30 (gas & oil)	24 hours driving time
Fornaire	$23.25 (gas & oil)	10½ hours (with strong head winds)

Average gas cost for the trip was 2.1¢ per mile. Allowing 52¢ per hour for inspection and maintenance costs and a reserve of 50¢ an hour for engine overhaul (approximate rate of $500 at manufacturer's recommended 1000-hour interval), my 110 mph average ground speed for this trip resulted in a direct-operating cost of 3 cents per mile for the trip (gas, oil, reserve for inspection, maintenance, 25-hour oil change, and engine overhaul). This gives a per seat cost of 1.5 cents per mile for this particular trip with a headwind. A no-wind condition would of course result in a lower figure.

Pricewise, the Fornaire comes in three models: The Fornaire-Explorer at $6995; the Fornaire-Expediter at $7895 (additional equipment—landing lights, Narco 25-crystal Simplexer, rate of climb, turn and bank); The Fornaire-Exacta at $8595 (additional equipment—big Narco power supply, 75 mg. marker beacon, Omniplexer, rotating beacon, clock, low freq receiver, air temp gauge).

• *Weather Potentiality:* This is not an instrument airplane and a pilot must count on sitting out a period of bad weather. However, you would have to more than double the Fornaire price tag to get an airplane with the necessary instruments, radio, de-icing and auxiliary equipment necessary for serious weather flying. And you'd have to spend the time and money to attain and maintain the professional skill necessary for instrument flying.

• *Conclusion:* If you want something easy, comfortable and fun to fly—with training-plane ease but business-plane speed—as economical to fly as your car is to drive—then the Fornaire is for you. The joker is that you can't load it up like a truck and you must sit out any serious weather. But you can't expect multi-engine performance at a single-engine price tag. For the average businessman pilot, the Fornaire holds the answer to an economical, practical, cross-country airplane.

• *Future Development:* As this article goes to press the Forney Company is putting into production a three-controlled Fornaire with rudder pedals. The control system is not a kit adaptation of the two-controlled airplane, but is built in as an integral part of the plane. It offers excellent opportunities for those who prefer three controls, as an instrument trainer, and as a trainer for such aircraft as the Bonanza or Comanche. END

Cradle of the "A" Engine

(Continued from page 29)

ress has been made with the indirect approach, but it was a nuclear-powered jet engine with the direct approach that was first successfully operated on that cold January day in Idaho to warm the hearts of the atomic scientists.

"There was an initial operating period of approximately six hours completely on nuclear power," said Dr. Shoults. "A subsequent test operation continued for 80 additional hours.

"Other tests have been carried out, and no control problems have developed in the starting and operating of the engine. The reactor was always stable and responsive to control. The tests proved the operability of the system and the predictability of performance. They also provided valuable information that was applied to design and operation of flight systems, blazing an invaluable trail for other tests that have been completed or are now underway to meet our objective."

But those initial tests were conducted with a huge model of an atom-powered jet engine, standing 32 feet high and occupying a dolly consisting of two railroad freight cars tied together. The new Flight Engine Test Facility now going up will be used to test streamlined editions of this giant in conjunction with airframes, typical crew compartments and control systems. You don't build such a facility in a month—or even a year. This one, even with the latest speed-up processes, is taking two years.

Of reinforced concrete, the building is being molded in five "pours." Saving considerable time, is the method worked out to utilize the same form on all pours. Sand jacks—drums of ceramic sand—support the form. To move the form, spiggots in the sand jacks are opened. When enough sand has poured out to lower the form several inches, the form is shifted to the next position, and again placed on the sand jacks. This is believed to be the first time that sand jacks have been used for such a purpose. A lot of concrete is going into the building—20,000 cubic yards. This is enough to construct a respectable dam. The concrete floor varies in thickness from 12 to 21 inches, but the 35 by 40-foot test slab in the building is really thick—six feet of concrete.

Adjacent to the main building will be a buried control and equipment building, connected by a 700-foot shielded road. The road, eight-foot wide pavement, will pass through multiplated culvert pipe ten feet in diameter. The entire length of the culvert will be covered with six feet of dirt. This will provide shelter for em-

(Continued on page 58)

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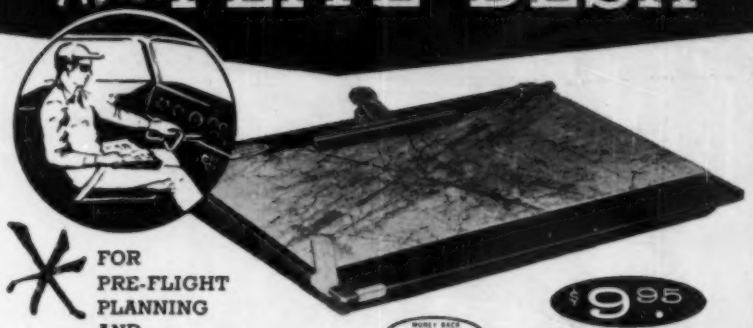

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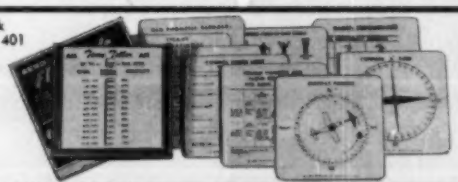

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(Continued from page 56)

ployees of the facility when they leave the building during an experiment.

Four-rail dolly trackage will extend into the main building and connect with trackage from other test and support buildings in the Aircraft Nuclear Propulsion project. A shielded locomotive will haul equipment to the test facility from the Hot Shop, which has seven-foot-thick walls and six-foot-thick windows. The locomotive cab will be entirely surrounded by lead and water to protect operating personnel.

With such precautions, it is expected that an atomic airplane will emerge from its concrete, lead, water and earth cocoon, just as did an atomic submarine, without radioactive harm to man. So far the major hazard at NRTS seems to be—antelope.

Recently Allan C. Johnson, manager of the Idaho AEC Operations Office, had to issue a bulletin asking employees to be more careful in encounters with the fleet natives of the sageland. The antelope, it seems, have been racing beside the workers' cars, then suddenly deciding to cross the road in front of the vehicles. To date, nine antelope haven't made it! END

NUCLEAR-POWERED BOMBER TO BE BUILT BY CONVAIR

THE AIR FORCE has announced selection of Convair (Fort Worth) Division of General Dynamics to work with the Nuclear Propulsion Division of the General Electric Company in the initial design of a nuclear-powered bomber prototype.

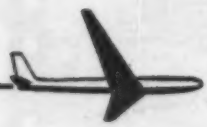
Most of the current work on the aircraft nuclear propulsion program is concentrated on development of the propulsion system. This will continue to be the case for the immediate future.

Lockheed had also been working on a preliminary design study and the Air Force will continue to support limited design work at Lockheed's Marietta Division plant. However, it is believed more efficient use of invested resources can be realized if a single airplane company works directly with the propulsion contractor in carrying out the design from this point on.

Nuclear research began at Convair-Fort Worth in 1951 and included design, construction and testing of the world's first flying nuclear reactor in a modified B-36 bomber, the NB-36H. General Dynamics' Electric Boat Division at Groton, Conn., built the world's first nuclear-powered submarines, the *Nautilus* and *Seawolf;* and its General Atomic Division in San Diego is engaged in developing an atomic powerplant for nuclear-powered merchant ships.

The nuclear work at Convair-Fort Worth is under direction of Andrew Kalitinsky, who has been associated with the Air Force's nuclear aircraft program since its inception in 1946.

PILOTS



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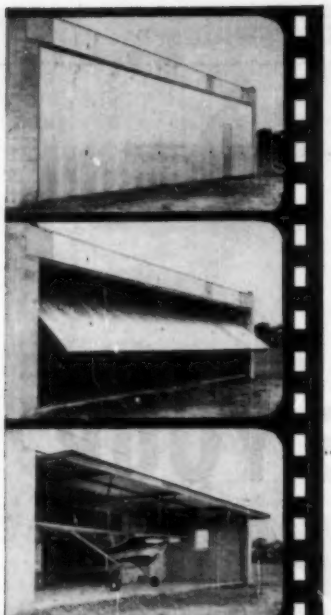

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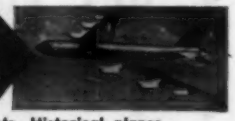

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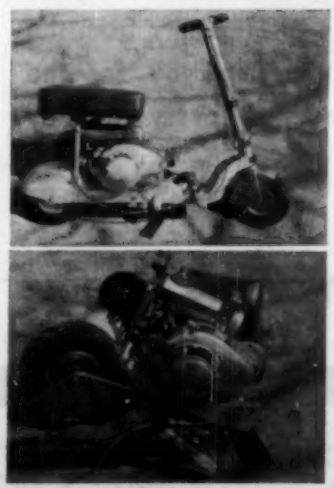

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Instruments

(Continued from page 31)

use them?" To get at this problem, let's start at the beginning.

How do we fly an airplane? Of course, we fly it by adjusting power and/or moving controls to force the aircraft into an attitude that will result in the flight path desired. This "attitude" is the relationship of the aircraft's axes, lateral, longitudinal and vertical, to the earth's surface. The relationship between the lateral and longitudinal axes and the earth's surface can be recognized by reference to either the horizon or a suitable instrument. The heading can be determined by visual reference to the terrain features or to a map-compass-gyro combination. Controlling the direction can be by "sighting," in "contact" methods, or by use of a simple common instrument. In any case, the principles and the actions are the same but there is a marked difference in the results.

Some pilots never learn to hold a straight course by visual means. It is not too difficult to do at low altitudes if weather conditions are right, but lowered ceilings, rough air, and restricted visibility can make it virtually impossible for even a highly proficient pilot unless he has the right instruments to fall back on. Fortunately, practically every airplane has been equipped with an instrument—a compass—that is suitable in varying degrees for this purpose, but a very limited percentage of pilots are thoroughly familiar with its use. A better instrument is now nearly universally available but proper training is still required.

When an airplane is flown solely by instruments, the pilot's performance can be accurately gauged, whereas under contact flight control, aircraft can be quite inaccurately flown without either the pilot or the passengers realizing the extent of the variations in altitude, speeds or turning rates. Since their sloppy contact flying seems okay to them, many pilots contend that it requires more training and skill to fly "instruments" than it does to fly "contact." This contention is not true except when applied to instrument low approaches and even then it requires some qualifying provisions. On the other hand, pilots familiar with, but not necessarily proficient in, instrument flight will readily admit that you can, and invariably do, fly with a far greater degree of precision and general accuracy by reference to instruments than is possible by visual flight methods. The "contact" advocate recoils from "instruments" for much the same reason that a fractious horse shies at a piece of newspaper. We are all a bit shy of the things we don't understand.

"Instruments" appeared on the aviation scene relatively recently and struggled through a protracted period of comparative unreliability. They have, therefore, been habitually relegated to the role of a substitute method of controlling an aircraft when the good old horizon can't be seen. Maybe we ought to teach "attitude instrument" flying first and "contact" later as a pleasant alternative system to be used only when the visibility permits. Certainly a pilot who can fly instruments wouldn't be hampered by a clear sky. There is no reason why pilots trained

on instruments should be any more inclined to neglect to scan the area than those trained in the old-fashioned way.

"Flying contact," we don't necessarily glue our eyes on a single point on the horizon to maintain an attitude and fly straight. We us our peripheral vision plus continually scanning the area to avoid collisions. Flying "instruments" in VFR weather is just a matter of training whether the pilot scans the area or not. It is no more necessary to glue our eyes on the flight instruments than it is to glue them on a point on the horizon. If it were, how would the solo instrument pilot ever check the facility chart, tune his radio, check his fuel, work his E6B, etc., without spinning in? Doesn't it really all boil down to the way one is taught?

It is quite appropriate to ask why we introduce the natural horizon as a clue in elementary instruction instead of utilizing a more reliable and more readily interpretable indicator. Students taught to fly by reference to an attitude indicator would be less likely to take off or remain airborne in an airplane not equipped for instrument flight when the natural horizon was obscured by poor weather conditions. Until we received initial "contact" flight instruction, the horizon played no part in our activities. As a "clue" to be used in actuating controls, it had to be introduced, explained, pointed out and referred to continually else our control responses would never have been conditioned to the point where they were involuntary. But, using the natural horizon has drawbacks that seriously retard training. The student's recognition of attitudes from lesson to lesson is seriously impeded by parallax created by his posture or other factors. And, of course, when you need it most, the horizon isn't there at all.

Training obviously would advance faster if we used an attitude indicator. Its indications can readily and thoroughly be demonstrated on the ground—there is no parallax and it is always there to see. The trouble is we didn't have instruments suitable for training in the early years and now it is hard to change our methods.

People who object to the CAB proposal would do well to review the "Experiment in Contact Instrument Flight Training" conducted by West Virginia University. It appears from that experiment that five hours of instrument training goes a long way towards improved pilot proficiency. Following is the CAA Inspectors' report of a flight test given one of the students at the termination of that experiment. This student had a total of 44:01 hours which included 4:35 hours dual instrument instruction.

Instrument Test:

a. Straight and level—Very good.

b. Stalls—Heading plus and minus 5 degrees. Very good.

c. Timed Turns—Okay plus and minus 50 feet.

d. Steep Turns—Okay plus and minus 50 feet.

e. Coordination—Okay.

f. Unusual Position Recoveries—Very good.

(Continued on page 62)

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(Continued from page 61)

Regarding another student, the CAA Inspector reported "This student's performance of the instrument phase was above average for a student with 5-6 hours instrument time. His execution of stall entry and recovery could be compared with that required on an Instrument Rating Check Ride."

More than four years ago the University of Illinois conducted an experiment in Simultaneous Contact-Instrument Flight Training which vividly testified to the value of including instrument training in the private pilot syllabus. The report of that experiment includes the statement "Simultaneous instruction on instrument and contact flying is, therefore, feasible in a regular course of instruction. Such instruction promotes rapid learning of both instrument and contact skills and also encourages a favorable attitude toward instrument flying."

It is entirely possible that the introduction of five hours of basic attitude instrument flight training preceding, or as a part of, the customary contact course would materially improve every pilot's capabilities. The resulting increase in flight safety would most certainly not be limited to circumstances occasioned by deteriorating weather. Whether or not any compelling regulatory action is taken, flight instructors would do their students a real service by voluntarily including attitude instrument instruction in their training programs. Experience has also proven that in elementary instrument training instruction need not be given by an instrument-rated instructor. END

Wings With Spring

(Continued from page 38)

It was in the air though that I noticed the greatest difference. Hands-off stability in rough air was amazing considering gross weight and wing span of the T-Craft. While this is not surprising in a well-trimmed C-46 or C-119, which I fly frequently, in a lightplane it is an unexpected bonus which any pilot will welcome. I climbed from 500 feet to 2,000 without touching the control wheel and using only slight rudder control except in clearing turns. After leveling off and trimming the plane, I discovered that only a light touch on the wheel now and then kept the wings level even over the rugged hills of western Pennsylvania.

During the stall the wings stayed on an even keel right up to the moment the nose dropped. But it wasn't the low stalling

"I don't know how they got you to come, but they told me it was made of cheese."

speed that impressed me, rather the exceptional stability of the plane up to the very split second of the stall.

In landing, this factor makes a much slower approach possible. Accident reports have indicated in the past that the BC-12D is not the safest aircraft in the world at minimum airspeed, yet with the wing strut cylinders, this particular one had positive control pressures and an "in-the-groove" flight path right down to the ground. Naturally this also shortens the landing roll after touch-down.

Perhaps the strangest effect produced by these wings with springs is their flapping action as the wheels touch the runway. Metzler has proven that he can drop his aircraft in from an altitude of ten feet without damaging the gear because of cushioning effect of the wings as they go from maximum dihedral to no dihedral when the wheels touch ground. Because of the quick take-off and short landing roll, U. S. Army Aviation officials have the new device under study at the present time.

The final test, as far as I was concerned, was whether the wings with springs were satisfactory in really rough weather. To prove that they were, Metzler and I did some cumulus research during which the cockpit gauge shot up to 300 pounds at times, twice normal pressure on the ground.

"Naturally I wouldn't recommend such a flight except in extreme emergency," Metzler said. "That's not the idea of these wing shock absorbers. But if a pilot is caught in a situation where flying through extreme turbulence is the last resort, then he has a much better chance. In ordinary turbulence it is not even necessary to slow down. Just watch the air pressure gauge and keep the wing strut loading within safe limits and you have no sweat."

Main pre-certification objection by conjecturing pilots was that at high speeds there would be a violent wing vibration. The CAA, also suspicious of possible vibration, put Metzler's plane through a thorough dive test. On the first dive, the CAA pilot couldn't keep up with Metzler's diving Taylorcraft so they had to make a second test after the examining pilot changed aircraft. The Taylorcraft reached a speed of 158 mph, far above test requirements and there wasn't a trace of vibration.

One enthusiastic veteran pilot from Maine bought a kit from Metzler (about $100) and installed the device on his Taylorcraft. After his first flight to Oquossoc for mail during which he flew near Mt. Washington and a few other 4,000 to 5,000-foot "hills," he immediately wrote to Metzler: "From flying around for many years in a T-craft, I know that today, even if I went slow, I would have gotten a creak and a groan or two out of the wings. With your shocks, no creak, no groan. Thanks for the best improvement ever put on a lightplane since the Wrights put an engine on their glider."

After flying Metzler's Taylorcraft, I'll agree that, while his shock absorbers can't perform miracles, his wings with springs really put big plane comfort into a small aircraft. END

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Operation Jericho

(Continued from page 37)

the French Underground. Doubtless every pilot who had been shot down and led to escape by the Resistance had some benefactor in Amiens. Here was a chance to help the heroes. Beyond doubt some of the prisoners would lose their lives in the bombing but not if Pickard's pilots could help it. They would give this one the best they had, both in planning and execution.

From the aerial photographs and underground information, a five-foot scale model was made of Amiens prison and its immediate surroundings. Everyone involved studied it until its minutest detail was deeply engraved in his mind. As a matter of fact, the model is still intact—a permanent exhibit in the Imperial War Museum in Whitehall, London.

The main prison building was of cruciform shape set in a courtyard bounded by a wall 20 feet high and three feet thick. The yard was fenced internally to segregate various groups of prisoners. The guards lived and ate in a special wing.

Pickard called in his demolition experts, and briefed them on the discrimination that must be exercised—a complete destruction of the guard quarters—but only enough destruction elsewhere to knock down the walls at specific points. Pinpoint accuracy was imperative if the prisoners were to escape the bomb blasts, yet be able to dash through the shattered walls to safety. Timing too was imperative if the escaping men were to avail themselves of the outside help that would be standing ready.

After considerable experiment, it was decided that 500-pound bombs with 11-second delay fuses would probably be the best compromise. It was later learned that 250-pound bombs would have sufficed, since the walls were held together by mortar rather than cement, but this information had not been available.

At 6 a.m. February 18, 1944, the final briefing of the 18 crews was made—plus the crew of the photo damage assessment plane. Six of the aircraft were from RAF Squadron 21, six from RNZAF Squadron 487, and six from RAAF Squadron 464. Also present were the skippers of the Typhoon fighter escort that was to protect the Mosquitoes to the target area.

The attack was to be made in three waves. The first wave of six aircraft was to breach the prison wall at several given points. The second following wave of six aircraft was to divide into elements of three. One element was to blow in the end of the wing where the guards had their mess hall and the second element was to wipe out the other end of the wing where the guard living quarters were located. The third wave was to stand by to polish off any omissions made by the first two waves or to attack targets of opportunity whose destruction might contribute to the total effect. The entire show had to be perfect in precision and timing—feet and seconds.

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dezvous with their fighter escort over the south coast of England. The formation flew at zero feet to avoid radar detection. Crossing the French coast, they swept around north of Amiens and approached their objective along the straight Amiens-Albert road on which the prison was located.

The secret of the rescue had been well kept, in spite of the fact that so many underground members were in the know. It had been feared that the movement of the helpers towards the prison, might have been spotted by enemy agents, and given a clue that 'something was brewing.' However, so well was everything organized, and so loyal were these gallant Frenchmen, that the raiders met with no opposition until after the first bombs had exploded. The whole thing was a complete surprise.

The New Zealanders made the first attack, and their bombs hit the wall smack at the bottom, tearing a great hole in it, giving plenty of room for many men to escape at the same time. The approach was made at less than 20 feet. Following that wallop, the second wave, this time the Aussie pilots, got their targets lined up through the smoke and dust and socked the two ends of the guard building. The job was done. The way was open for the prisoners to escape. Only then did the A A open up.

While this was being done, Pickard was circling the target to see how things were going. The attack had been so successful that there was nothing for the third wave of the RAF pilots to do, and he ordered them home. Just then he saw one of his Mosquitoes brought down by the fierce flak of the German defenses. Determined to investigate the crash to discover the fate of the crew, he was himself 'bounced' by a pair of F W 90s. Caught thus preoccupied, and detached from fighter escort, which was covering the withdrawal of the main forces, he was brought down a few miles from Amiens.

The photographic Mosquito meanwhile made three runs over the prison. The camera verified the breaches in the wall, the ends of the guard building smashed, prisoners escaping through the gaps, and in the last run over the target, some patriots were seen disappearing across the snow-covered fields outside the prison.

The operation was not completed without loss for, in addition to Pickard and his navigator, two other Mosquitoes and two of the fighter escort were lost. Pickard's body and that of his navigator were subsequently recovered by friendly villagers, who had seen the whole action.

Saddened as they were by the loss of their leader and other colleagues, those who took part in the operation felt that the sacrifices had not been in vain. Over 250 prisoners escaped for good. The German guard outfit was wiped out. News of the daring attack put renewed spirit into the Resistance men. The story was spread all over occupied territories at lightning speed. Of course, many of the inmates were also killed and wounded by the bombing, but these brave people knew there was that chance, and they willingly took it.

(Continued on page 66)

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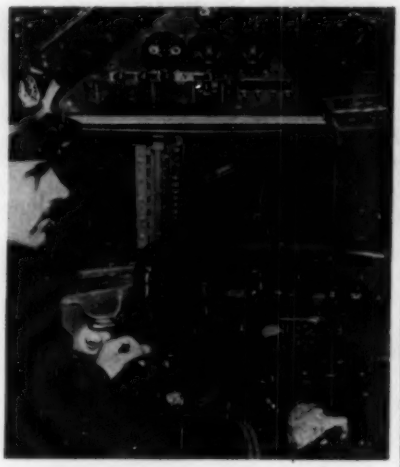

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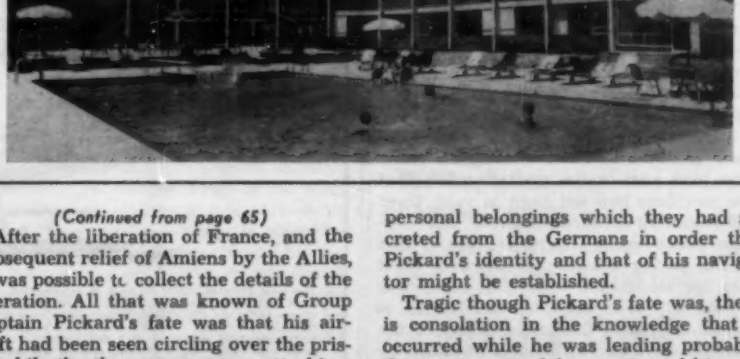

(Continued from page 65)

After the liberation of France, and the subsequent relief of Amiens by the Allies, it was possible to collect the details of the operation. All that was known of Group Captain Pickard's fate was that his aircraft had been seen circling over the prison while the three waves were attacking. As soon as his comrades reached Amiens after the invasion, seeking news of their leader's fate, the villagers presented them with photographs of the graves and a few personal belongings which they had secreted from the Germans in order that Pickard's identity and that of his navigator might be established.

Tragic though Pickard's fate was, there is consolation in the knowledge that it occurred while he was leading probably the most successful operation of his gallant and brilliant career. The attack on Amiens will remain one of the most memorable achievements of the Royal Air Force. END

Temco Pinto

(Continued from page 41)

picked up at a reasonable rate and at 60 knots a little back pressure on the stick lifted the nosewheel off the runway. Between 75 and 80 knots, the airplane lifted. Definitely airborne, I raised the gear and, by the time they thumped into place, we were showing 100 knots. This seemed enough speed to lift the flaps. There was a slight feeling of settling which I probably emphasized by dropping the nose to pick up best climbing speed as quickly as possible.

This is 150 knots. Here again the old pilot is due for an unusual reaction. Although engine noise was clearly discernible, there was no vibration on the initial climb out with full power. Jet power is so smooth as almost to give one a feeling of no power. This may not be true in the bigger jets but the TT-1 has a rating of only 920 pounds thrust. I had the feeling of hanging on a thread. It seemed a long time before we finally picked up climb speed but actually, when we reached the end of the runway, we had 150 knots.

Another unusual phenomenon I noticed at speeds from about 100 to 150 knots was a rather quick lateral motion as though someone were waggling the wings. There was no aileron movement but you did get this little rolling from side to side. At first I thought I must be over-controlling but finally decided to ignore the action. Every time we picked up speed, it would disappear. Later Collis explained it as characteristic of the airplane due to a dihedral of 6 degrees. Actually the movement is so slight that, once you know the reason for it, you tend to forget it.

With 100 per cent power and at 150 knots we climbed at 1,500 feet per minute. At 7,000 feet we leveled off and reduced power to 92.5 per cent, which is normal rated thrust and approved for continuous operation. The airspeed soon stabilized at 190 knots indicated; a true speed of approximately 216 knots. At optimum altitude (about 15,000 feet) this will improve to 235 knots or approximately 270 mph.

As we climbed I had become aware of the finger-light control pressures. Unconsciously I had expected them to stiffen up considerably as we leveled out at cruising speed. However, they retained their light and sensitive touch, due, I suppose, to the fact there is no propeller blast over the tail. While this is delightful, it might be a drawback for student and inexperienced pilots. A progressively stiffer back pressure is a subtle warning of possible stall.

Experimenting with turns, it became quickly apparent that this is an aileron airplane. We can roll from one steep turn into another using ailerons only. The ball hardly budges from its center position. And, incidentally, the rate of roll is very rapid—so fast that it almost made me dizzy.

Influenced by articles about the big military jets, I had been wondering how one slowed a jet to stall. On this airplane it was no particular problem—throttle back and lift the nose. It did take a little longer because the airplane is very clean and there is no propeller to create drag.

(Continued on page 68)

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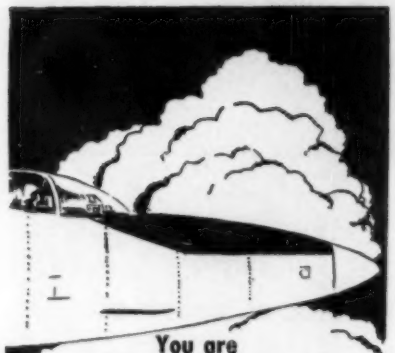

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(Continued from page 67)

However, there is no need to lift the nose unduly high. As airspeed fell under 70 knots I began to feel a slight stick shake and as we approached the stall (about 58 knots) the shake increased.

The Pinto has as pretty a stall as I've ever experienced first is a mild buffet which is more in the nature of a shudder. The nose drops and you pick up speed. The shuddering and the stick shake stops. If you continue to hold the stick back the whole process starts over again. The nearest comparison I can think of is the Cessna 172—but a little better because with power no torque develops and there is no tendency to fall off. You could sit there with the nose bobbing up and down all day. With nose down and power on, there was no feeling of gaining speed any faster than many of today's business aircraft. This is a safety factor for student pilots. I doubt the airplane will "get away from them" as some airplanes can do in recovery from a nose down maneuver.

A few chandelles and lazy-8's again emphasized the light control pressures and sweet handling of the plane. The speed brake control is mounted on top of the throttle, a spring-loaded toggle switch. They can be stopped at any time during the opening or closing cycle by releasing pressure on the thumb control. The brakes are composed of a three-segment, hydraulic operated flap installed on the trailing section of the vertical fin just below the rudder, and on the lower section of the tail cone. I was surprised at the mild action. There is a fairly quick loss of 25 to 30 knots. However, it is not sudden enough to throw one against the seat belt as I understand speed brakes on larger military jets will do. Marty explained that the travel had been limited to avoid this. One unusual action was noted during the extension of the brakes—a gentle pushing forward on the stick. It actually travels several inches forward—a result of the changing air flow over the elevators caused by the split section of the fin.

This trim change can quickly be overcome by the trim tab at the top of the control stick, which also actuates the aileron trim. Incidentally, this was my first experience with this type of trim tab control and I'm real sold on it. It makes a manual trim tab seem like a lot of work.

As to wing flaps, 20 degrees of down flap will offset the downward pitch caused by the speed brakes. With full flaps one gets slight pitch up so that normally one wants nose down trim to maintain an 80 knot approach speed. However, the pressure required to hold the nose didn't bother to change the trim.

On the first landing, heading down wind with about 1,000 feet, I throttled back, went into a turn and raised the nose, trying to slow to 150 knots (maximum speed for lowering gear and flaps), and applied the speed brakes. By this time I had gained enough altitude for a power off landing. However, I set the power at 70 per cent and proceeded with the approach.

After all that I had read about the slowness of a jet engine in coming from idling up to speed, I was loath to cut the power back to idling. And since I had little feel-

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ing for the glide angle of the airplane, I didn't want to take a chance on being caught low, short and minus power. However, Marty fiinally suggested we were in good shape and I pulled the throttle all the way back. I had been holding 100 knots and, as we turned into final, I pulled the nose up and slowed to 80 knots. From there on in, everything was just as normal as in any airplane I ever flew. At that moment I was convinced that Marty's conversation about the Pinto being as easy to fly as a Cub was based on fact, despite that it grosses 4,400 pounds. At no time did I have the feeling that I was handling anything heavier than a Cessna 182 or Beech Bonanza.

The interval of time required by a jet to pick up from idling to 100 per cent of power emphasizes that a pilot had best think ahead to anticipate power needs. Collis gave me a quick rundown on the facts. A turbine, almost regardless of size, takes from 11 to 20 seconds to run from idling up to 100 per cent of power. The longest portion of that time is from idling up to 60 per cent. From 60 per cent to 100 per cent takes about 5 seconds and from 80 per cent to full power takes less than 3 seconds. The trick then is never to reduce power below 70 per cent until finally committed to landing. If there is need to go around one can bring power full up about as quickly as in a piston engine. With speed brakes on, flaps and gear down; the pilot has no feeling of carrying too much power at 70 per cent.

The glide angle surprised me. I had expected the TT-1 to sink rapidly with idling power. Actually it feels about like most business aircraft. The plane will glide more than 2 miles for every 1,000 feet of altitude. However, don't let that make you too complacent. At 121 knots, best glide speed, this takes less than a minute.

On my last landing, Collis had me shoot a 180 side approach carrying only 60 per cent of power. This is about the minimum percentage you'd want to carry in any jet on preliminary approach. He had me aim for a spot, which I surprised myself by hitting. I was interested in noting how quickly I had become acclimated to the airplane. On first take-off I had felt that I was hanging by a thread at 100 to 150 knots. By the last take-off I no longer noticed it.

The amazing thing about the entire experience was the completely anticlimatic reaction I felt as I climbed out of the airplane. Sure, it's always thrilling to fly a new type. But the big thrill I had anticipated was missing. Marty Collis was right. This was such a simple airplane to fly that there was no feel of conquest.

Actually, this experience has been oversimplified. It does not make me a jet pilot. There are a number of procedures on which I was not checked—starting procedures under all types of conditions, midair restarts, emergency operation of gear, and other detail that one should know about a particular type of airplane. However, these are no more difficult to learn than are the procedures on aircraft that we fly every day.

I did get three impressions. First, I see

(Continued on page 70)

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(Continued from page 69)

no reason why a beginning student couldn't learn as easily on this airplane as on any other primary trainer. In some respects it might be easier.

Second, any instructor should be happy to transfer to the TT-1. While the noise level is not quite as low as I had thought it might be, the jet is so smooth that three to five hours of instructing per day should be much less fatiguing than in piston-powered trainers. I climbed into the back seat and found that the instructor has as good visibility as the student. This is a wonderful improvement over some of the older trainers. Many of the controls also have overrides so that the instructor can take complete charge should a student "goof off".

Third, should the time ever come when business and private jet airplanes are offered to the public, no pilot with 200 hours or more should have a bit of trouble in transition. The biggest problem will be one of learning good preflight planning and fuel management. Even this little jet drinks fuel in a hurry and has only one and a half hour's flight time. While I'm sure business aircraft would have an increased fuel capacity, the fact still remains that there is no room for getting lost or stooging around.

One thing is certain. You can get spoiled mighty quick. This jet flyin' *is it!* END

I Learned About Flying

(Continued from page 48)

picked up the Mohawk Valley and groped our way east until we hit Schenectady where we got the plane serviced, gulped our coffee, and decided to skip the Weather Bureau because it was getting late. That big old "sucker hole" over the airport had lulled me into a false sense of security. And I neglected to take into account that the days were getting much shorter.

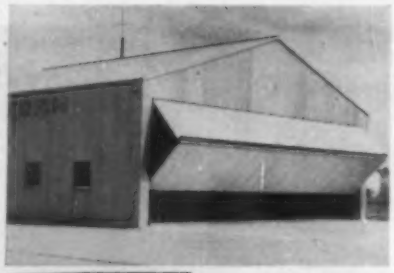
We were airborne again at 16:15 and headed for Albany, where we would pick up the Hudson River. My plan was to follow the river south to Kingston, thereby avoiding the hills over which a direct course would have taken us. The showers were widely scattered along the river, and the base of the clouds was about 1,500 feet. The smoothness of the engine and the improved weather made me all the more certain of getting back to Bridgeport that day, even if the last few miles had to be flown after dark. At Kingston we turned southeast and passed over Pleasant Valley, with Poughkeepsie off our right wing. The base of the clouds looked awfully close to the tops of the hills ahead, but there would probably be just enough room to sneak under. The closer we got to the hills, the more it appeared that it would be impossible to get over them VFR, and I had no intention of sticking my nose up inside that overcast. The chart showed a small grass field just south of us, so a landing seemed advisable to talk the situation over with someone more familiar with the local terrain than I. There was only one person at the airport when we landed, and he assured us that once we got over

the ridge of hills to the east it would be wide open and all we had to do was to follow the white highway through a pass in the hills. So at 17:45 we took off again with light rain falling and daylight rapidly fading. I was doing the flying now and picked up the highway, heading east toward a spot where the valley cut a deep wedge out of the ridge. Although the base of the clouds obscured the tops of the hills, by staying over the highway it would be possible to slip through just below the overcast. Just then something about two miles ahead caught my eye. At first glance it looked like the face of a cliff. "Impossible!" Nothing on the chart showed any such terrain features; besides, this thing runs from the ground right straight up into the overcast. It was a solid sheet of rain completely blocking out all forward visibility. I racked the Cessna around in a 180, determined to follow the highway back through the pass and spend the night in Stormville. By this time the lights in the town of Pawling were blinking up at us through the rain. Rolling out of the turn, the pass I had intended to fly back through, completely disappeared in the lowering clouds. This time there was no alternative. We had to land without delay.

Just south of the town lay a nice large hay field running lengthwise into the prevailing wind. Although it was just about dark, I decided to "drag" it to be on the safe side. It looked real good with no signs of holes or boulders, and the grass looked short. Pulling up, a standard approach brought her in just a shade high over the downwind edge of the field. Chopping the power caused her to settle immediately, and we touched down three points, with two-thirds of the field still ahead of us. I purposely avoided "standing" on the brakes, choosing to let the airplane slow itself down on such a smooth field. Suddenly we were thrown against our safety belts and wound up with the airplane flat on its back. The door on my side had sprung open; and we scrambled onto the wing and across the field like a couple of scared rabbits. We looked back from a safe distance away expecting to see the airplane on fire. As we were going up on our nose and over on our back, a shower of sparks had literally lighted up the field. To see the airplane lying there now not on fire only deepened the mystery. We walked back toward the plane.

There it was! Wound around the propeller and wrapped around the landing gear were the broken remains of a two-stand barbed wire fence. In the rain and darkness I had failed to see it. It was the wire scraping against the airplane that had caused the shower of sparks.

Where was I at fault? I had had five chances that day to exercise real judgment by tying the airplane down and postponing the trip. Instead, although lacking in experience and instrument flying, I attempted to push the weather and found out the hard way that it can't be done. VFR means just that. Leave the bad weather flying to the professionals. You may not get home as quickly, but you will get home. END



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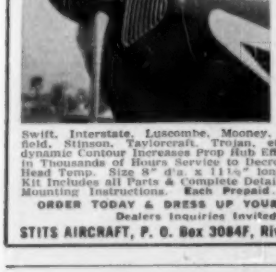

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Flicker Vertigo

(Continued from page 39)

"They looked as if they were floating in space. It took real mental effort to believe them!"

At one time the Nazis were reported to have attempted to use Flicker Vertigo as a "secret weapon" by flicker-interruption of searchlight beams trained upon Allied night bombers. There is no record that it met with any degree of success, however.

The U. S. Air Force was fully aware of the potential seriousness of this breed of vertigo during the phasing-out period of single-engine propeller trainers. Fortunately aware of the consequences of Flicker Vertigo, the Air Force was able to give its pilots simple counter-measure training, and the Directorate of Flight Safety Research at San Bernardino reported that, as a result, flicker disturbances from propeller and helicopter blades, and intermittent light flashes, seldom progressed to the accident-inducing stage.

Unfortunately, the Air Force did not make its findings available to civilian pilots, although it could have done so, widely and effectively through a CAA NOTAM or special bulletin. Had this been done it is barely possible that a wealthy young Los Angeles pilot would be alive today.

Joel Thorne took off from Lockheed Air Terminal on a stormy night, flying a low-wing single-engine plane. Seven times his plane was seen to enter low-hanging clouds and then come hurtling down in tight, diving turns from which he recovered barely above the roofs of North Hollywood homes. But on the seventh time his frantic pull-out tore a wing from his plane, which crashed into an apartment house and burned. Thorne had had numerous brushes with CAA officials over erratic flying, and the immediate popular guess was that he either had been drunk or lacked sufficient instrument time to qualify him for IFR flight.

Two Civil Aeronautics Board investigators were not so sure, however. At least, they wanted to see for themselves what could have happened to make Thorne lose control of his plane seven times in succession, with similar results each time. They rented a plane identical to that flown by Thorne. On a hunch that it might be significant, they even mounted an anti-collision light on the top of the fuselage, at the same forward location of a light that had been on Thorne's plane. And then they waited for a dirty night with low, scudding clouds approximating the overcast of the night of the Thorne accident.

In reviewing Thorne crash findings (Accident Investigation Report No. 2-0050) the CAB said that in simulating the Thorne flight its investigators experienced "serious vertigo" as the rapidly rotating beam of the anti-collision light gave a whirling illumination of mist enveloping the plane. They found that their only escape from vertigo was to dive out of the clouds, and they recommended that all pilots in the future turn off flashing anti-collision lights for the duration of flights through overcast.

Isolated reports of Flicker Vertigo, in-

cluding infrequent reports from airline passengers that they had become ill while staring through the whirling blades of propellers, raised an interesting question three years ago: Might Flicker Vertigo have been the cause of many "Cause Unknown" accidents?

But what alerted James N. Peyton, CAB's noted "crash detective" and Investigation Division chief to instigate a multi-agency investigation of Flicker Vertigo, an investigation that still was under way at last report, was the striking absence of vertigo reports by survivors of accidents involving airworthy planes flying in ideal weather.

Could it be that pilot-victims of Flicker Vertigo might be unwilling to confess that just before the crash they had been seized by sudden, violent, seemingly-unexplainable dizziness and a panic-inducing vision red-out? Could it be that they would conceal what they might feel to be a "secret malady" rather than risk indefinite grounding and even psychiatric scrutiny?

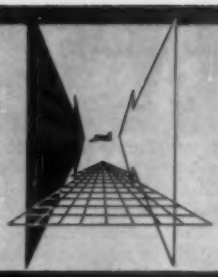
The conjecture interested Peyton as opening a phase of accident studies not previously explored.

Flicker Vertigo can leave one equally "shook" because its origin has been obscure; it hits with devastating suddenness, and it is frighteningly violent. It happened like that to me, and I kept it a secret for years until, reading the CAB Thorne report, I was convinced that I had not momentarily lost a few marbles. I was riding as passenger in a helicopter on a bright spring morning when I became conscious of flitting black-barred shadows of the rotor blades as my pilot swung into a new heading at about 2 o'clock high. Almost instantaneously a violently-pulsing red cloud destroyed my vision, and I was gripped by excruciating, uncontrollable panic. I struggled to get out—500 feet above a green meadow! My safety belt held! My baffled pilot, thinking that a moving part might have broken loose and hit me, immediately banked and headed for home base. And just as quickly I recovered, completely.

Experimentally, we tried the "panic heading" again. This time I would be ready for it; would resist it. But again it was as before: complete, disorganized terror and loss of all orientation as the bright red flashes blinded me and beat down all willpower. Had I been on the controls and barely above ground a pileup would have been inevitable. My pilot accepted my explanation with, I sensed, a mixture of interest and cautious sympathy. Many months later, with almost an apology for the suspicion he must have felt, he related that he, too, finally had experienced momentary vertigo from rotor blade shadows; relieved when he immediately changed his flight heading.

There you have it . . . the cause and the cure!

If you're in a 'copter when it hits, a quick touch of new heading should serve nicely. If in a plane, idling and settling toward the late afternoon sun, be ready to kick rudder and pour on the power. You probably will lick it before it can lick you! The best defense, of course, will be to avoid, if possible, a direct-into-sun landing that will throw shadows of the idling prop into your eyes. END



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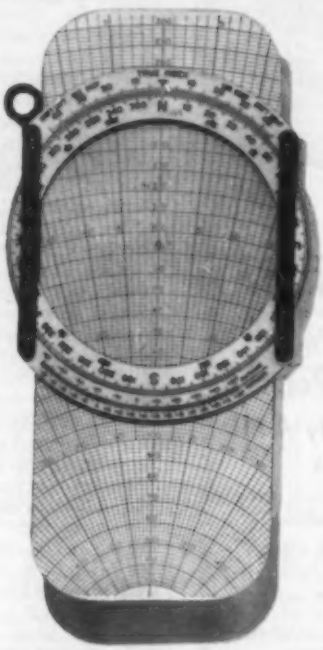

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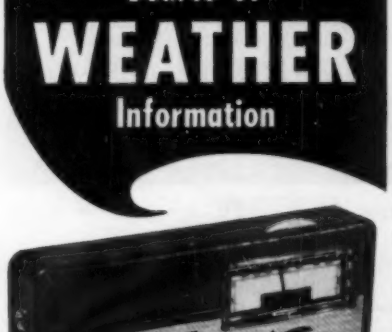

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Non-Stop Texas to England

(Continued from page 27)

and surrounded by snow showers.

A puzzled British voice answered my position report at Yarmouth and requested further identification of this "Mooney 46 Baker." "How many engines and where is the proposed destination?" came the query. Canadian regulations forbid over-water flight in single-engine airplanes and Yarmouth Radio suggested I land and talk this thing over! After the invitation was declined, Yarmouth suggested at least filing an IFR flight plan along the airways. Since that would lengthen the crossing considerably, this also was declined.

"How about giving us your ETA over each five degrees of longitude?" was Yarmouth's next request.

"This I will be happy to do if you can tell me direction and velocity of winds between 5,000 and 15,000 feet across the North Atlantic," I replied.

"We can't do that because the information is not available," said Yarmouth.

"Then I can't give you the ETAs because I will have no way to determine my ground speed or position until I have reached the other side," I replied. At this point relations with Yarmouth Radio were no longer friendly. I had hoped to get more weather from Torbay Radio, jumping-off point for the crossing, but in light of our "severed relations" I felt it best to say nothing and continued on my way.

An hour beyond Torbay, the weather had deteriorated alarmingly. We were picking up light rime ice and St. Elmo's fire danced eerily from the prop and along the fuselage to the radio antenna. If you ever want to feel small and insignificant, place yourself in a single-engine plane at night, in icing conditions, in a leaden overcast out over the North Atlantic. Your mind will work frantically for a good legitimate excuse to turn around and go back, and fear will be your only companion. This may be why you don't get sleepy or hungry on a flight of this kind.

Dawn broke and my spirit soared when I saw a little piece of the sun breaking through a rift in the clouds ahead. Climbing to 12,000, it looked as though I could stay on top of the overcast. But as the sun rose higher, the clouds began to build into towering cumulus, and it was obvious that VFR flight would not be possible. Icing conditions in the clouds became more of a problem as increasing turbulence and heavier showers of freezing rain were encountered.

At this point Mooney 46 Baker took matters into her own hands and began to settle toward the icy waters below. We had entered a particularly heavy shower and picked up just a little more ice than our altitude could handle. At 5,000 feet the temperature reached 32 degrees and the ice began to break and shed itself.

Every so often through a break in the clouds, I would get a glimpse of the powerful North Atlantic. From 5,000 feet the waves appeared to be of giant proportions, breaking in slow motion torrents of foam. I learned later those waves had turned back veteran North Atlantic

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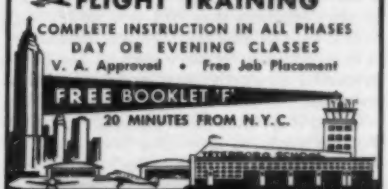

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steamships and had delayed both the Queen Mary and Queen Elizabeth over 24 hours.

I had no radio contact for eight hours after last hearing Torbay. At 1317 Greenwich time I picked up Shannon Radio on the ADF. According to the azimuth indicator, I was directly on course to Shannon, about 150 miles north of the intended course—with ten hours of fuel still on board and only 200 to 300 miles out from Shannon . . . or so I thought.

Six hours after picking up Shannon Radio, the ADF needle swung 180 degrees and I gave a sigh of relief as I called to check in. The fuel picture had changed. With only four and a half hours of fuel left, Rome was now out of the picture, but Paris was in range and an arrival there would have broken the record.

Shannon Radio suggested I file an IFR plan on airways to Paris, but here again the added distance would not permit this luxury. So I was referred to London control which was very understanding and cleared me at 8,500 on a direct route from Shannon to Paris, requesting only that I give them my fuel remaining on board prior to crossing the English Channel.

I had run my last fuselage tank dry at Shannon, and as I crossed southern England two hours and 15 minutes later, I ran the left main wing tank dry. Seventeen and a half gallons remained in the right wing tank, or two hours and 15 minutes more of flying time. My estimate showed Paris to be one hour and 50 minutes southeast. This gave a 25-minute reserve. We were "fat"!

I switched the selector to the last tank and the engine quit. Gas would not feed from this tank! It was 9:30 at night and I was at 8,500 feet somewhere above southeastern England. London Radio had been giving a 700-foot ceiling and half mile visibility with fog, and I knew most of England had much the same. Calling London control, I told them my situation and that I was going to have to go down.

They requested I switch to emergency channel, 121.5. By the time I was on emergency, three controllers were calling me. One said the nearest field was 40 miles east and started giving a bearing to it. Before I could inform him I had no power, a voice chimed in, "This is Yeovilton tower. I have you on radar five miles south of our field. Steer a heading of 350 degrees for a GCA approach to Yeovilton. What is your altitude?"

I blurted into the microphone, "I'm at 5,500 feet and entering the overcast."

"You are now four miles from touchdown," said Yeovilton, "ceiling is 700 feet and visibility one-half mile. We have a 7,000-foot runway with high intensity approach lights . . . you are now three miles from touchdown . . . steer a heading of 345 degrees . . . you are now three-quarters of a mile from touchdown . . . you should be able to pick up the high intensity lights."

Through the charcoal mist a line of lights slanting gently off to the left began to appear. "I'm picking them up," I said. The voice answered, "This is Yeovilton, we are turning the runway lights up. Can you see them?"

(Continued on page 76)

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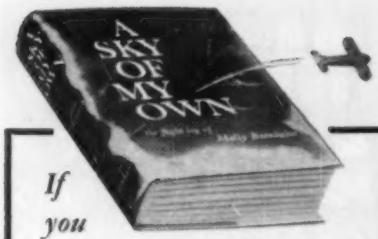

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(Continued from page 75)

A pyramid of lights formed slightly to my left, and I eagerly called back, "Roger, I have them in sight." Breaking through the overcast, I glided in for a landing on a beautiful 7,000-foot runway.

The flight had covered a distance of 4,800 miles and a total time of 32 hours and 40 minutes. It fell 100 miles short of breaking Bill Odom's record. For this, I felt badly, but on the other hand I felt quite lucky to have been able to make a power-off GCA to a field on the one night of the week when night flying exercises were being held. Mooney 46 Baker and I were fortunate the alert British tower crew were proficient GCA controllers.

As a sequel to my story, it is customary in Royal Navy protocol for a guest to visit the base commander. So, though I was wearing a bright orange flying suit and white tennis shoes, the executive officer took me to the officers' wardroom where a very formal dinner was in progress. There he whispered in the base commander's ear. Giving me a sharp glance, he smiled, stood up, and announced that a Mr. Mullen (in the bright orange flying suit and white tennis shoes) had just flown in from Houston, Tex., in a small single-engine plane and would I please come in and tell them all about it.

Needless to say, I felt a little out of place walking into the candlelit dining room amidst all of the formally attired officers. But, it was an extremely pleasant sensation just being near people again. Obviously, the base commander thought this was all part of the evening's entertainment and I tried to act my "role" as best I could. I don't think anyone in the room thought my story true until newspapers began calling and we adjourned to the flight line to look at the airplane.

In 1957 Mooney 46 Baker splashed into the North Atlantic 40 miles off the coast of Spain with Bill Wyatt at the controls; towed ashore by Spanish fishermen, she was returned to Texas and rebuilt there. Last September she staggered around the world under the most adverse conditions, with Chuck Banfe at the controls. And now she has fallen short of her long sought after record by a mere 100 miles or so. Mooney 46 Baker is a gallant lady from a fine line of thoroughbreds, and I am proud to have made my first Atlantic crossing in her. Someday she'll break that record! END

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This summer on Thursdays, Fridays, Saturdays and Sundays of four consecutive weeks, July 9, through August 2, the FAA will conduct a traffic survey at some 750 general aviation airports, 340 military fields and all airline fields. With the help of Civil Air Patrol volunteers at the civil fields, every pilot making a landing or take-off will be asked to fill out a questionnaire. The survey will aid in establishing the first accurate analysis of air traffic operations. Your cooperation is urgently needed.

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Have You Read?

(Continued from page 16)

chief for the airline, rechecks Gort, confers with him and is convinced that the wings' design and load factors of the Phoenix are to blame, implying the aircraft is basically unsafe. His theory is unacceptable to the airline officials and Atlas engineers, and his judgment of Gort is seriously questioned. While Gort is reinstated to jet duty on the Singapore run, he is humiliated by unannounced flight checks by other airline officials. Their biased reports cast doubt on Gort's flying ability and on Hugh Dallas.

The climax comes after Gort's second crash on take-off from Ranjibad, India, on a hot, humid night. This one is fatal to all aboard and is promptly and officially declared a result of pilot error.

The loyalty of Hugh Dallas to Gort and his case against the "Phoenix" brings some concessions from airline management in the form of a revised take-off procedure and, unknown to Dallas, sends the Atlas engineers secretly back to their drawing boards.

While Gort's name is never cleared, a new model of the "Phoenix" with redesigned wings quietly slips into the passenger loading docks at London Airport. The public pays no heed, but to Hugh Dallas and a handful of associates, this new "Phoenix" represents a gleaming monument to a great pilot who gave his life, honor and professional integrity for the sake of flight safety.

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30, 31—WILLIAM D. FEENY
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42, 43—ROBERT L. PERRY, C. L. HAMILTON
44, 45—FORNEY INDUSTRIES
46—HUGHES TOOL CO., SIKORSKY AIRCRAFT, TRECKHER AIRCRAFT
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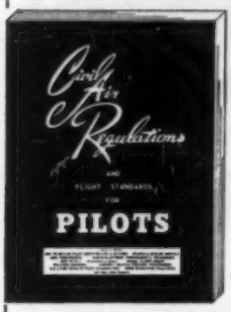

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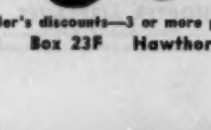

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ADVERTISER	PAGE NO.
Academy of Aeronautics	78
Acme School of Aeronautics	75
Adams Aircraft Sales, Inc., Jack	81
Aero Design & Engineering Co.	22
Aero Products	58
Aero Publishers, Inc.	78
Agrotors, Inc.	81
Aircraft Finance, Inc.	70
Aircraft Radio Corporation	3rd Cover
Airtex Products	81
American Airmotive Corporation	71
American Flyers Incorporated	58
Argyle Scooter Cub	60
Aviation Photo Exchange	60
Aviation Service Corp.	76
Basch Co., George	61
Basin Harbor Club	76
Beech Aircraft Corp.	9
Cessna Aircraft Company	2nd Cover
Champion Aircraft Corp.	61
Champion Spark Plug Company	12, 13
Colonial Aircraft Corporation	77
Continental Motors Corporation	67
Dave's Army & Navy Store	64
Del Airtronics	6
Doyn Aircraft Inc.	72
Drive-In Hangers	70
Du Pont Aircraft Service, Inc.	64
Edo Corporation	58
Electric Auto-Lite Company, The	54
Electric Power Door Co., Inc.	60
Embry-Riddle Aeronautical Institute	53, 64
Esso Standard Oil Company	49
Flying Equipment Sales Co.	68
Flying Subscriptions	81
Flynn, Dr. John T.	78
Gem Aircraft, Inc.	73
Gluckmann Aviation Company	78
Herter's Aircraft Division	77
Indiana Technical College	78
Insurance Company of North America	70
Jeppesen & Co.	15
Kane Aero Equip't	56
Ke-Pilot Mfg. Co.	62
L.T. Labs	74
Lear Inc., LearCal Division	17
McCauley Industrial Corporation	63
Merlite Industries	70
Metzler, Earl G.	62
Meyers Aircraft Co.	65
Miracle Power Products Corp.	72
Mosher Mfg. Company	71
National Aeronautical Corp.	7
Northrop Institute of Technology	8, 57, 66
Pan American Navigation Service	52
Parks College	68
Phillips Petroleum Company	19
Piper Aircraft Corporation	5
Raleigh-Durham	81
Rinehart & Co.	76
Ross Aero Publishers	69
Ross School of Aviation	69
Scott Aviation Corp.	16
Shannon School of Aeronautics, Inc.	74
Shell Oil Company	4th Cover
Silvaire Aircraft Co.	18
Skycraft Design	72
Skyhopper Airplanes, Inc.	77
Socony Mobil Oil Company, Inc.	11
Southwest Airmotive Co.	65
Southwestern Industrial Electronics Company	68
Spartan Aircraft Company	51
Spartan School of Aeronautics	55
Standard Oil Company of California	21
Stits Aircraft	72, 74
Survival Equipment Co.	77
Tactair Incorporated	3
Teterboro School of Aeronautics	74
Todd's	60
Varsity Shop Specialties	52
Vest Aircraft Co.	54
Weems System of Navigation, Inc.	73
Westair	78
Winslow Company, The	75
Zahns Airport	54

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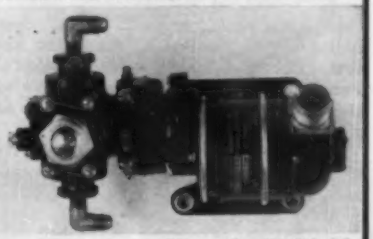

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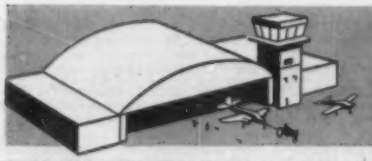

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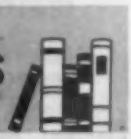

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OVERNIGHT STOPS

JULY 19, 1959, Annual Flyin-Drive-in Chicken-Bar B-Q sponsored by the Angola Jaycees. 11:00 A. M.—2:00 P. M. at the Tri-State Airport, Angola, Ind. New Cessna showing and parachute jump also.

MAKE the most of your West Coast trip with the Vacation Air Guide. Lists 400 fields in seven states, B. C.; recreation attractions, accommodations, pilot info. $3.00 per copy. Vacation Air, 1949 East 28th, Eugene, Ore.

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"WHERE ELSE BUT AT JACK ADAMS SALES . . ."

By Bill E. Burk, Memphis Press-Scimitar

. . . Customer No. 687

Leon M. Tucker (right) of Hughes, Ark., a veteran of more than 5000 hours, talks over a Bonanza purchase with George S. Martin, vice president of Jack Adams Aircraft Sales in Walls, Miss., and Memphis, Tenn.

"I know where to go when I want to make the best deal—to either of Jack Adams' places," says Tucker. "I know that when I want an excellent used plane, Adams is my safest bet." The fact that the Bonanza purchase is Tucker's third since Adams began selling planes in January 1957 is proof positive that he is satisfied with the dependable sales service every pilot enjoys at Jack Adams' operations.

Tucker's purchase was the 687th sale for Adams.

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Briefings . . .

(Continued from page 10)

the Aircraft Industries Assoc.; available through National Aviation Education Council, 1025 Connecticut Ave., N. W., $1. (2) "Missiles—From Concept to Countdown" (free) from AIA, 610 Shoreham Bldg. and (3) "Managing the Airspace" (free); the Air Transport Assn., 1,000 Connecticut Ave.

NEW EQUIPMENT makes for considerable home work for the overhaul and maintenance crews on the new jets. Miss Jeanie Crossland, receptionist at American Airlines Jet Maintenance and Engineering Center at Tulsa, Okla., poses on stacks of manuals which must be digested by the men who keep the jets flying. Several of the volumes run to as much as eight inches in thickness. Background for this set-up is a now familiar 707 jetliner. The $20 million AA Center was dedicated June 17-20th last.

CONTINENTAL CAN CO. and Pratt & Whitney Engine Co., have both ordered Lockheed JetStars for executive transports. This four-engine, 10-12 passenger, pure jet is being produced at Lockheed's Marietta, Ga. plant. Continental, which has 140 plants throughout the U. S. and Canada already operates a fleet of seven multi-engine executive aircraft.

EXPANDING ITS SOARING SCHOOL operations at Chemung County Airport, Elmira, N. Y., Schweizer Aircraft offers a new brochure "Soaring Holiday" listing courses available—and costs—including Schweizer's latest, an Advanced Soaring Course. At Elmira, Capt. Richard W. Smith (left), chief pilot for Champion Paper and Fibre Co. of Cincinnati, O., discusses soaring techniques with Bernard M. (Bernie) Carris, chief gliding instructor, before a Schweizer 1-23 sailplane. Capt. Smith secured his Commercial Glider Rating here last year.

EDO CORPORATION has developed a new model hydraulically-operated amphibious float for aircraft in the Cessna 180 class. Designated as Model 439-2705 float, the new gear features an hydraulic retraction system for quadricycle landing gear, replacing the electrically operated retraction mechanism previously used. Installation of Model 439 float on the Cessna 180 has received FAA type certification.

OLIVER F. JENKINS, JR., Rd. 4, Norristown, Pa., formerly VP and general manager of Wings Field, Philadelphia, has opened his own agency for the sale of executive aircraft.

MOST RECENT State Airport Directories and/or charts coming to our attention are from the State Departments of Aeronautics of Illinois, Alabama, Nebraska and New York. For Illinois, the address is Capital Airport, Springfield; Alabama, Montgomery; Nebraska, Lincoln and New York, State Dept. of Commerce, 112 State St., Albany 7.

CAPITOL WING NO. 2 of the newly founded Society of Airway Pioneers recently hosted—and honored—in Washington, D. C. several members in recognition of the parts they played in the development of this country's vast network of air navigation and communication facilities. Seated (l to r) Charles Stanton, early CAA Administrator; Wm. P. MacCracken, 1st Ass't Sect'y of Commerce for Aeronautics (1926); Rear Adm. L. O. Colbert, USCG (Ret.) pioneer in development of aeronautical charts. Standing: Chris M. Lample, Chr. of Awards Comm.; Clinton M. Hester, 1st Administrator under CAA Act of 1938; W. Clifton Stone, early employee of CAA; and Carl F. Kusrow, Regional Dir. (Capitol Wing).

PIPER'S NEW agricultural airplane, the "Pawnee," is being equipped with a FRAM Filtronic type air filter, said to be capable of the exceptionally high dust removal efficiency of 99.5 per cent. The 150-hp low wing "Pawnee" will carry this type filter as standard equipment according to the manufacturer.

A TEN-STATE EXPANSION in its Pratt and Whitney distributorship territory by Southwest Airmotive now makes this service available in a 15-state area, extending from the Canadian border to the Gulf of Mexico. States added to previous territory are Kansas, Missouri, Illinois, Indiana, Nebraska, Iowa, Wisconsin, No. and So. Dakota, and Minnesota. Authorized engine overhaul is available at SAC's main plant at Love Field, Dallas, Tex.

PURCHASED BY RETA, LTD., an aerial taxi service of Londrina, Brazil, this Beechcraft Bonanza is the 10th to join the company's fleet. Taking delivery were Mr. and Mrs. Sidney Polis who piloted their new possession over the 5,000-mile trip home. Mr. Polis and partner, Milton Jensen, operate RETA to all parts of South America, averaging around 150 flying hours per month on each of its Bonanzas.

THE CITY OF EAGLE PASS, TEX. would like it known that it has recently completed a new Municipal Airport with a 3,400 ft. runway, of which 2,500 ft. is paved. The airport, only one mile from the International Bridge, makes Eagle Pass and Piedras Negras both easily accessible, and offers an excellent opportunity for a week-end "South of the Border," according to Mr. Doyle J. Duke, City Manager.

THE CIVIL AIR PATROL'S new military commander, Brig. Gen. Stephen Davenport McElroy assumed his duties of office April 1 last, succeeding Maj. Gen. Walter R. Agee, USAF. General McElroy, a command pilot with 132 missions and 875 combat hours, joined CAP as special assistant to the commander in January this year. Prior to that he had for two years been Chief of Staff of the U.S. Air Force Academy.

STRIKING KEYNOTE of the interior of this Westinghouse executive Fairchild F-27 is the mural (made of Westinghouse Micarta) which depicts astral sphere in orbit around the earth, and dominates the cabin's forward bulkhead. The mural rendered in special paints and impregnated into a single Micarta sheet is in three pieces, opens to give access to the pilot's compartment. The entire interior was designed and executed by Horton-Horton of Fort Worth, Tex. All seats swivel 360 degrees, and the four VIP chairs amidship are tracked. In the rear quarters 74-lb. sofas convert to beds and curtains provide sleeping privacy.

FAA RECORDS bring to light the interesting fact that there are more than 350 active certified pilots in the United States 70 years of age and over.

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